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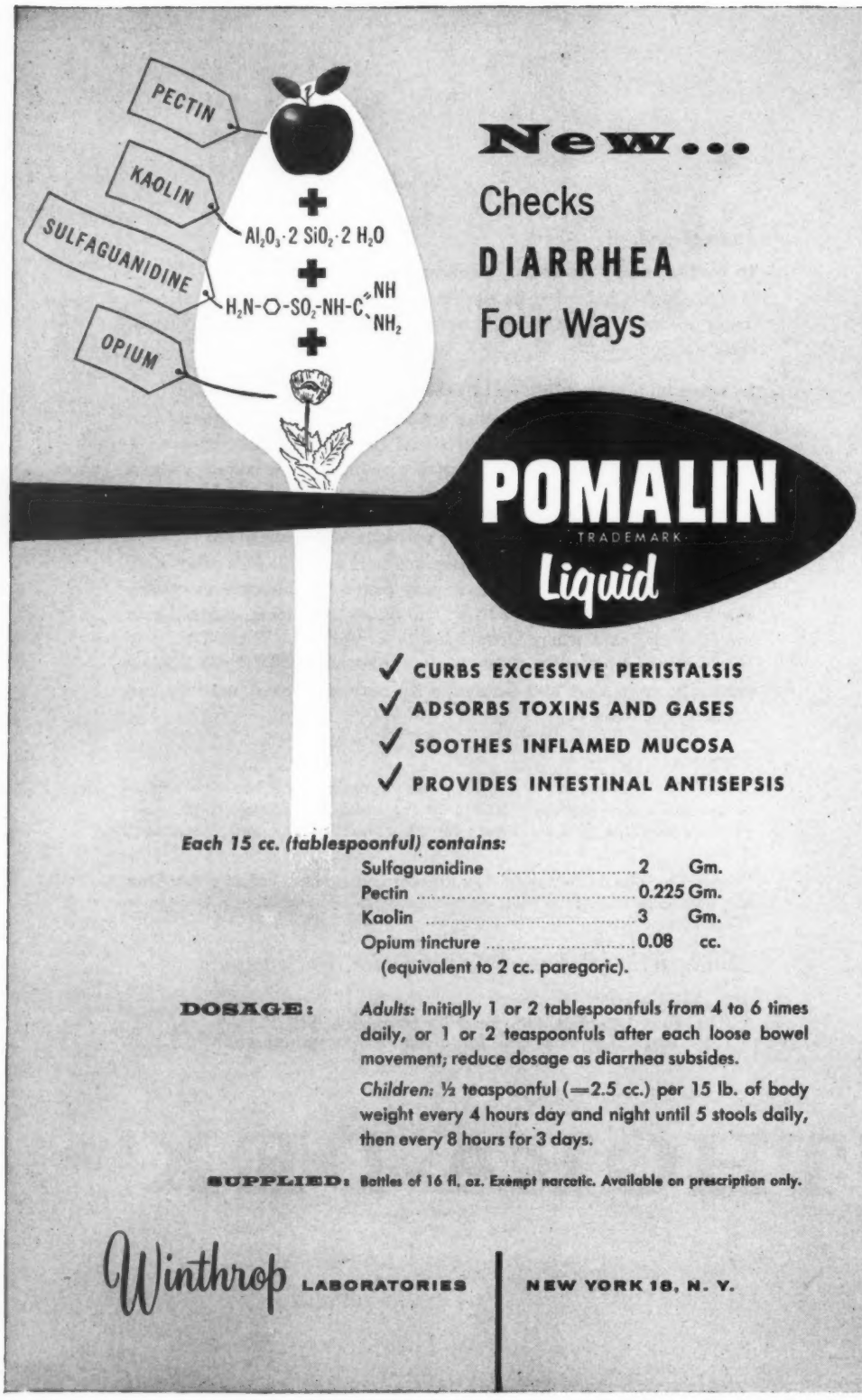
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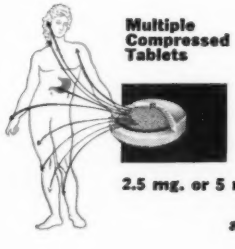

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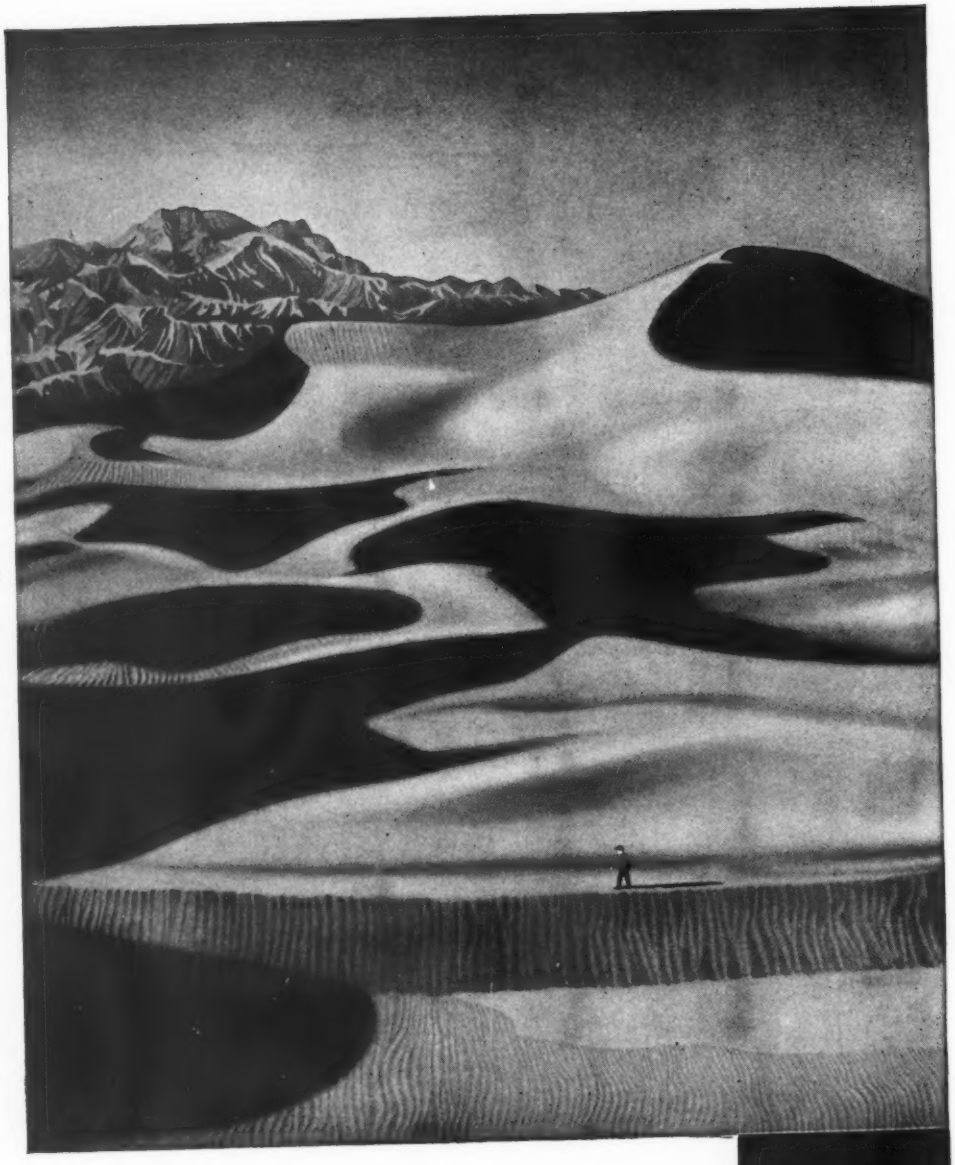

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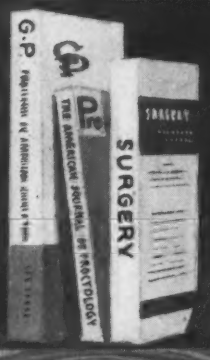

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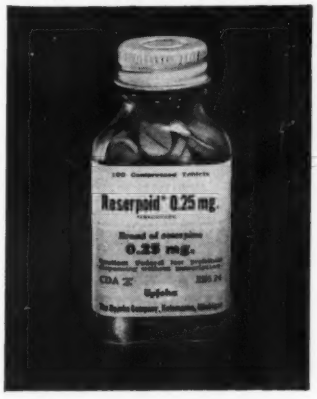

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(1) Crenshaw, J. E.: Am. J. Digest. Dis. *17*:387, 1950. (2) Lichtman, S. S.: Diseases of the Liver, Gallbladder and Bile Ducts, ed. 3, Philadelphia, Lea & Febiger, 1953, vol. 2, p. 951. (3) Sherlock, S.: Diseases of the Liver and Biliary System, Springfield, Charles C Thomas, 1955, p. 642. (4) King, J. C.: Am. J. Digest. Dis. 22:102, 1955.

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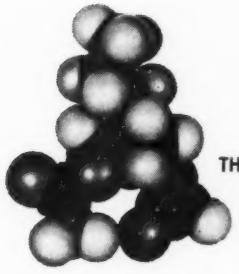

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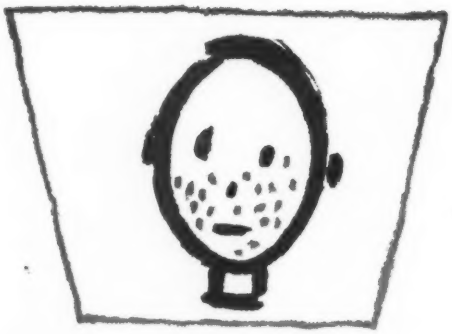

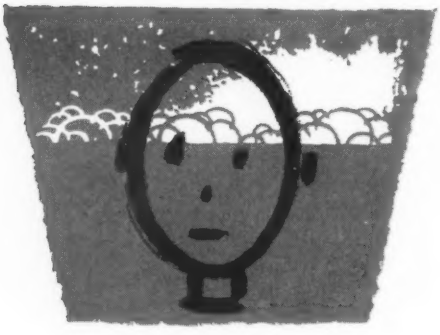

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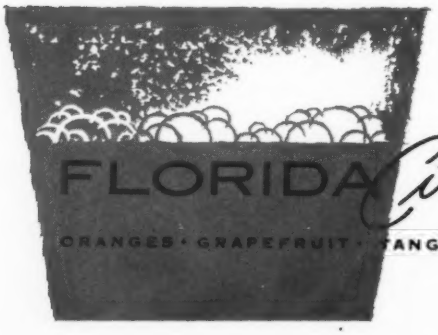

References:
1. Morris, G.E.: A.M.A. Arch. Derm. & Syph., 70:363, 1954.
2. Bluefarb, S. M.: Post-grad. Med., 19:144, 1956.

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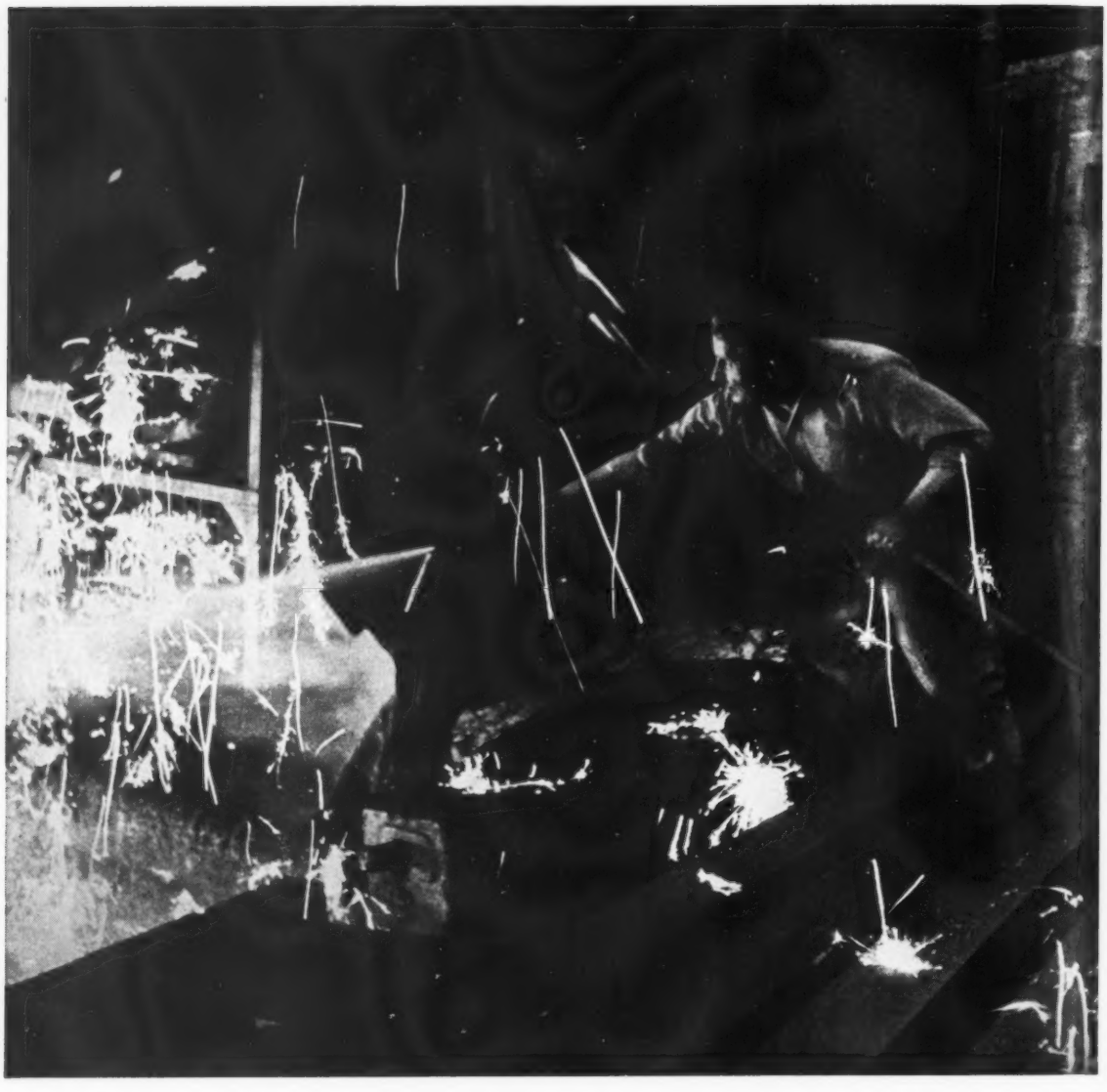

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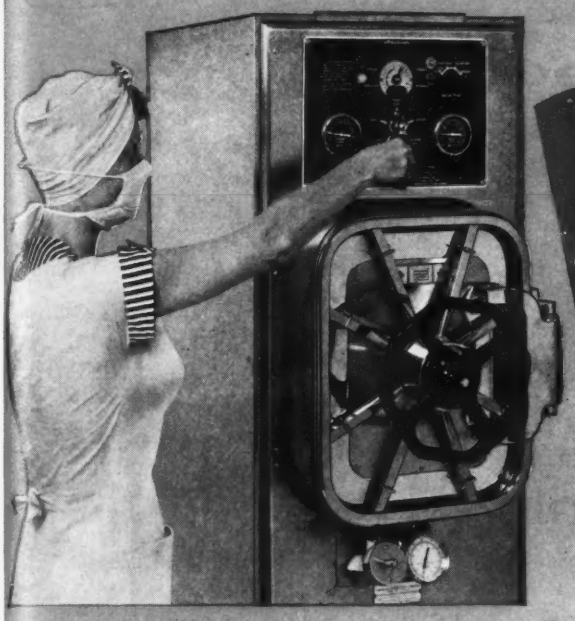

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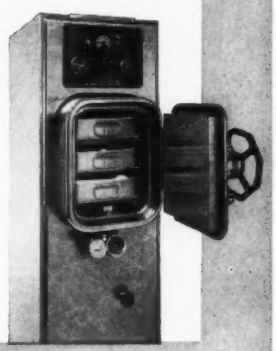

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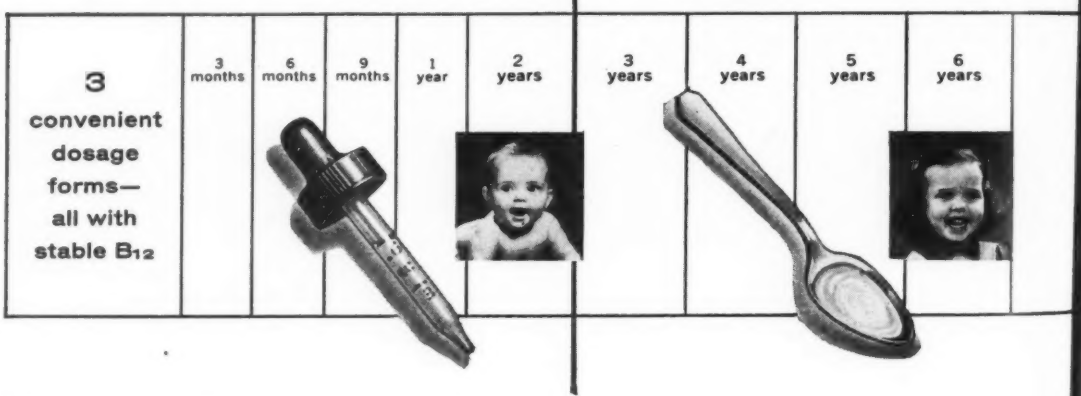

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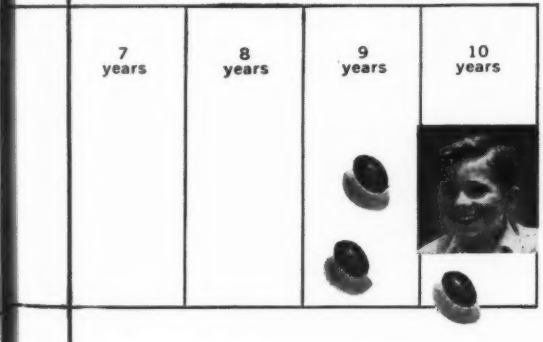

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1. Bender, T. J., Jr.: J.M.A. Alabama 24:217, 1955.

2. Hermann, I. F., and Smith, R. T.: Jl.-Lancet, 71:271, 1951.

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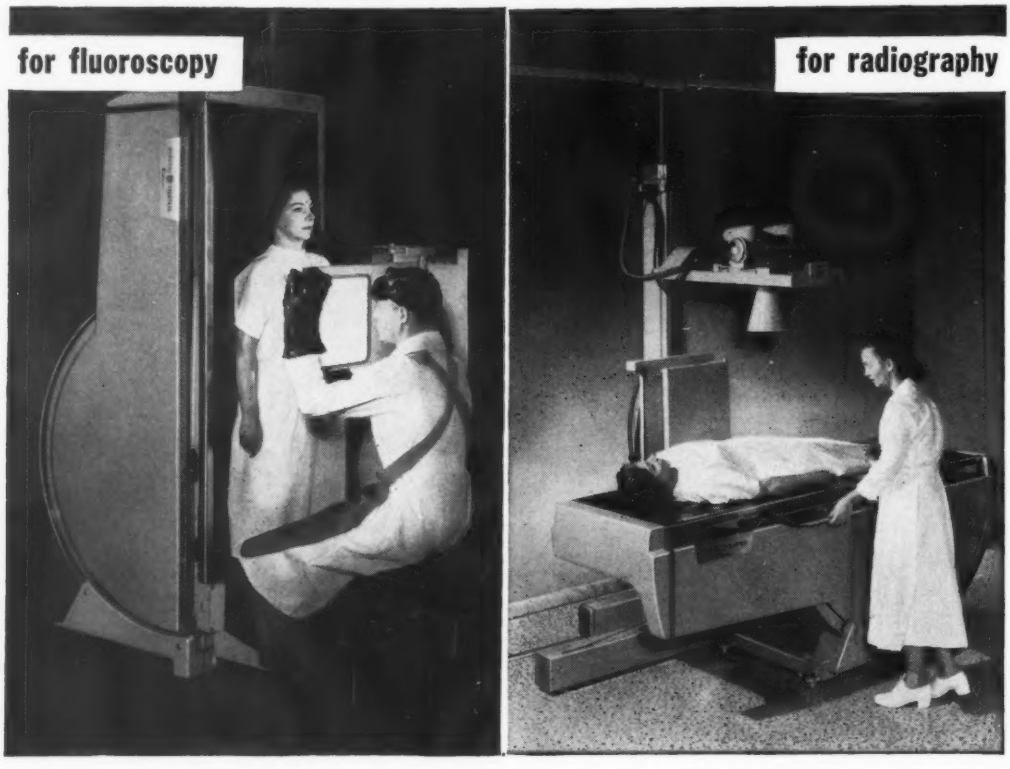

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1. Bradley, J. E.: Mod. Med. 20:71, No. 20, 1952.

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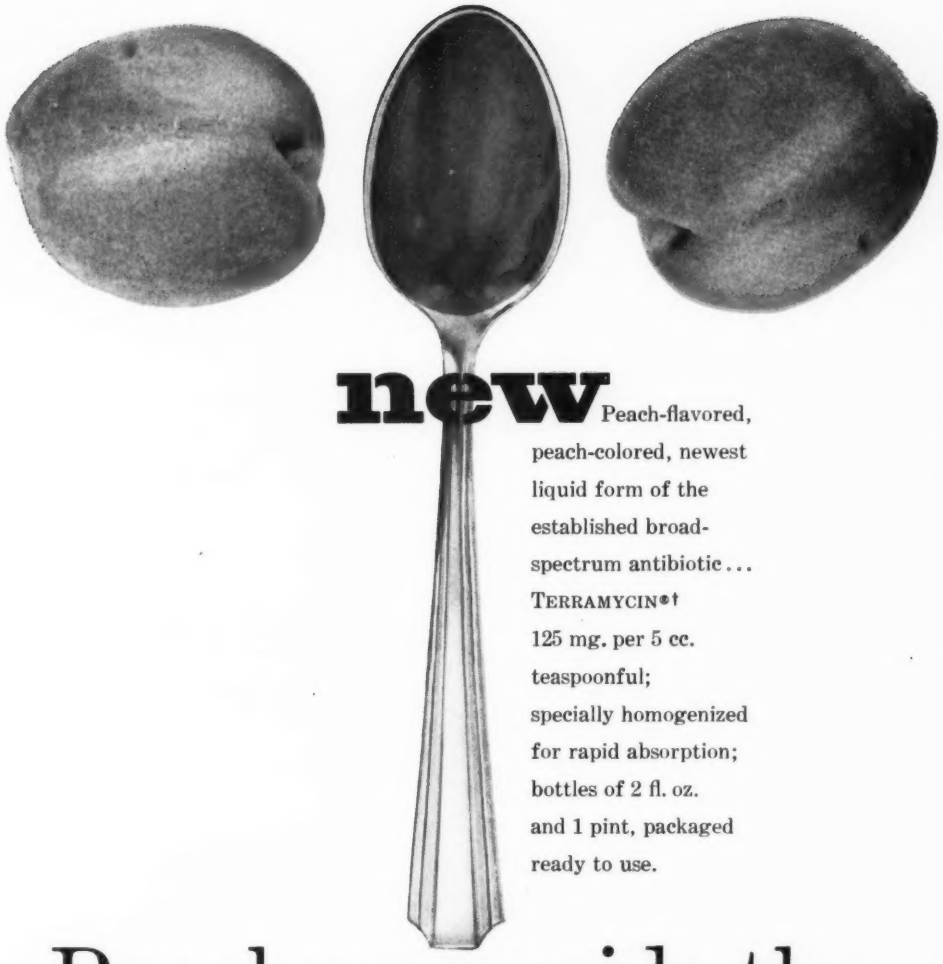

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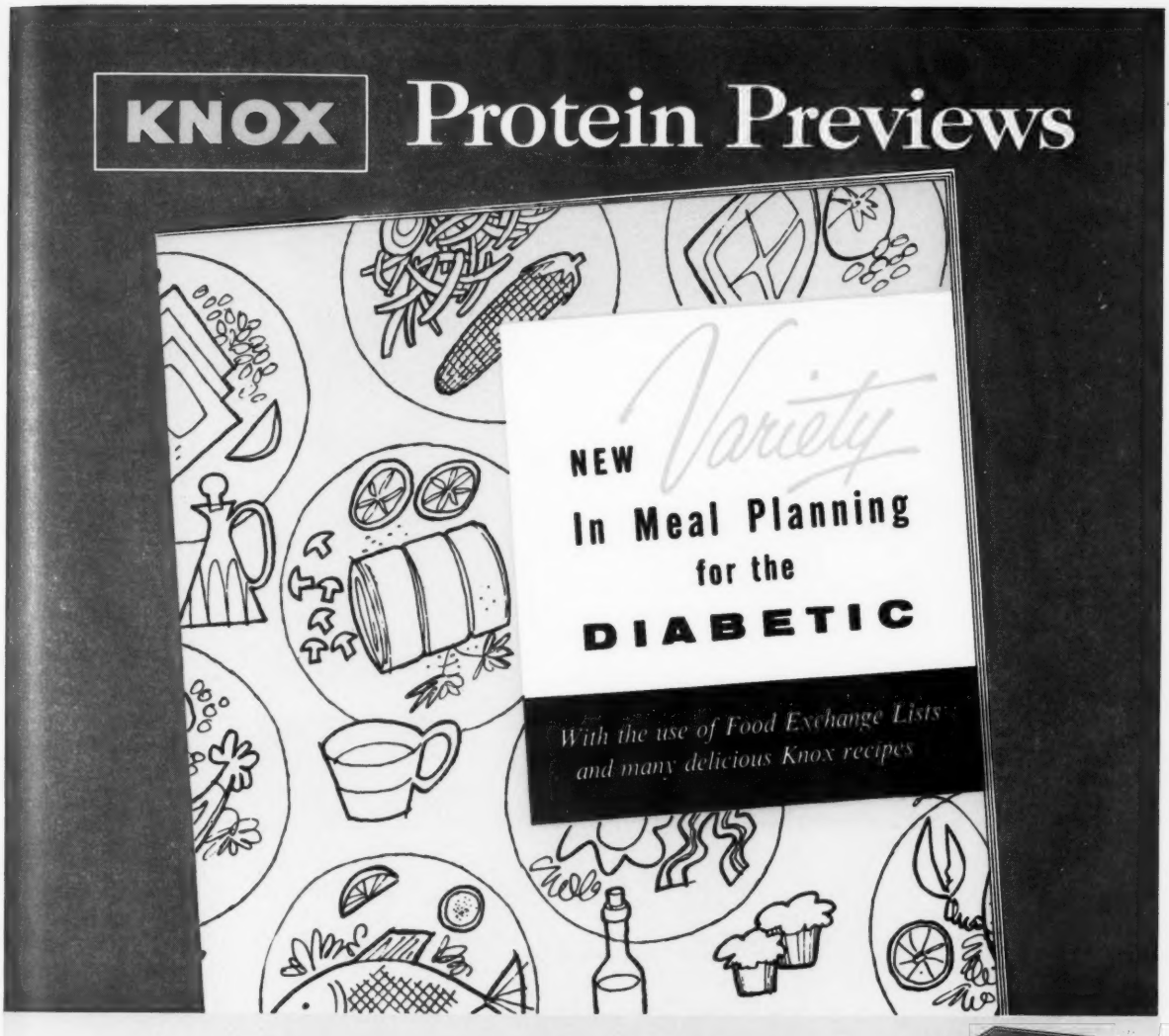

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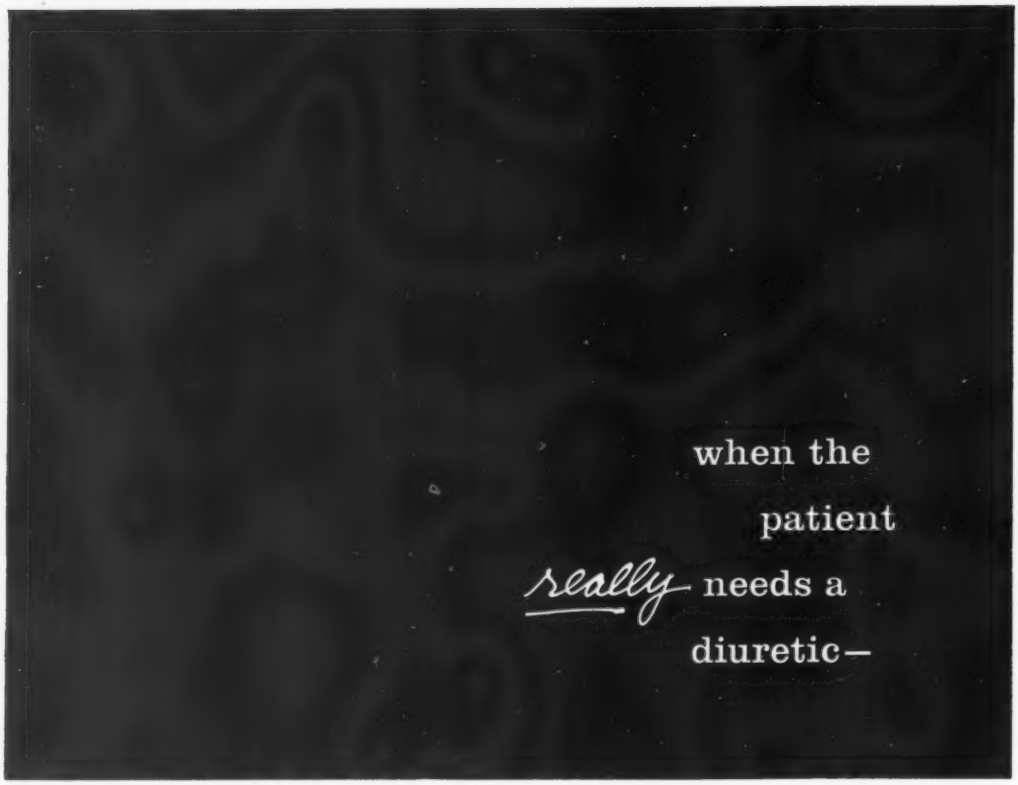

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The Journal of the American Osteopathic Association

PUBLISHED MONTHLY BY THE AMERICAN OSTEOPATHIC ASSOCIATION

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Vol 55, No. 10 June, 1956

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The Role of the Specialist in Physical Medicine and Rehabilitation In the Practice of Osteopathic Medicine of Today*

WILLIAM W. W. PRITCHARD, D.O.

Coordinator of Osteopathic Training
College of Osteopathic Physicians and Surgeons
Chairman, American Osteopathic Board of
Physical Medicine and Rehabilitation

Los Angeles

I have been asked to discuss the role of the specialist in physical medicine and rehabilitation in the practice of osteopathic medicine of today. The vast contributions to knowledge made possible by research, especially during recent years, have resulted in rapid advancement in all fields of the art of medicine or healing. Following the work of Pasteur and Lister, the field of medical microbiology has been most enthusiastically investigated. The fields of physiology, chemistry, pharmacology, and many others have held great interest and yielded much information of immense value. The only field which has received less attention than it deserves is that of physical medicine and rehabilitation, in spite of the fact that Dr. Andrew Taylor Still called its importance to the attention of the medical world more than 75 years ago. There are many reasons why this has been so, but I shall not enumerate and discuss them in detail. It should be sufficient to state that the maiming effects of three wars in one generation, an era of almost universal mechanization, and the problems accompanying an ever aging population are now calling the attention of many scientists to the need of investigation in the almost unexplored field of physical medicine and rehabilitation.

Within the last decade, in answer to the demand for specialized knowledge in this field or area of practice, physicians with D.O. degrees and physicians with M.D. degrees have each established a specialty college or section and a specialty certifying board in physical medicine and rehabilitation.

To discuss the role of the certified specialist in physical medicine and rehabilitation as related to the practice of osteopathic medicine of today, it is necessary to establish: first, what is meant by the term "specialist in physical medicine and rehabilitation," second, what is understood by the practice of "osteopathic medicine of today," and third, the relationship between the two.

Reference to a "specialist in physical medicine and rehabilitation," while both accurate and descriptive, is quite cumbersome and does not seem to fit properly into an age which places so much accent on speed. Apparently to meet this situation, the word "physiatrist" was coined. It is a cumbersome word to use, and I seriously doubt that it will ever attain popular usage. When printed it has been confused with the word "psychiatrist." Some certified physicians will not try to pronounce it and on their cards or stationery refer to themselves as "Diplomates" of the Board. Probably specialists in physical medicine and rehabilitation following the pattern set by government and quickly taken up by industry and the professions will eventually use only the initials and will be loosely referred to as "P.M. and R. specialists."

The specialist in physical medicine and rehabilitation must have certain training and qualifications. First, he must not only be well trained, he must also be able to demonstrate his ability as an average or better-than-average practitioner of general osteopathic medicine. To this basic foundation he must add 3 years of special training in the field of physical medicine and rehabilitation before being eligible for examination by the American Osteopathic Board of Physical Medicine and Rehabilitation, and if he passes the examination he must practice his specialty for another 2 years before becoming certified. This special training may be obtained in approved rehabilitation centers or in approved hospital residencies; for those osteopathic physicians who meet certain qualifications, the United States Public Health Service has indicated that it will finance at least 1 year of training either in this country or abroad, the selection of the institution and arrangements to be made by the trainee himself.

The approved residency training program in physical medicine and rehabilitation at the Los Angeles County Osteopathic Hospital is as follows: residency on a 3-year basis; requirements: D.O. degree, 1 year approved internship, and valid California license to practice or eligibility for one.

*Presented at the Fifty-Ninth Annual Convention of the American Osteopathic Association, Los Angeles, July 18, 1955.

The residency training program includes:

1. Adequate clinical and bedside personalized instruction
2. Direct and comprehensive reading program, including:
   a. All osteopathic journals
   b. *Physical Therapy Review, Archives of Physical Medicine and Rehabilitation, Journal of the Association of Physical and Mental Rehabilitation*
   c. Texts:

Bierman, W., and Licht, S., eds.: Physical medicine in general practice. Ed. 3. Paul B. Hoeber Co., New York, 1952

Krusen, F. H., ed.: Physical medicine and rehabilitation for clinician. W. B. Saunders Co., Philadelphia, 1951

Kessler, H. H.: Principles and practices of rehabilitation. Lea & Febiger, Philadelphia, 1950

Page, L. E.: Principles of osteopathy. Academy of Applied Osteopathy, Kansas City, Mo., 1952

Fryette, H. H.: Principles of osteopathic technic. Academy of Applied Osteopathy, Carmel, Calif., 1954.

The active head of the department is responsible for establishing and administering the training program to meet the requirements of the Bureau of Hospitals and the specialty board. A resident spends full time as an employee of the hospital and is assigned to duties by the head of the department. A resident is not permitted to participate in any professional or business activities outside the hospital during the term of his residency. Insofar as possible, the resident should attend all surgical procedures relating to patients under his care. A resident must keep accurate record of work done in the department and submit this to the head of the department for review and verification, this record to be available for review by the hospital inspector and in making application to the certifying board.

First-Year Program:

1. Preliminary indoctrination and orientation
2. Basic sciences, as per board requirements, by lectures, tapes, assigned reading, and practical application
3. Written reports of the basic principles in each of the following:
   a. Osteopathic manipulative therapy
   b. Hydrotherapy
   c. Thermotherapy
   d. Phototherapy
   e. Electrotherapy
   f. Exercises
   g. Ultrasonotherapy
   h. Speech therapy
   i. Occupational therapy
   j. Corrective therapy
   k. Physical education
   l. Gerontology and geriatrics
   m. Public health
   n. Electromyography
4. Care of patients
5. Written reports on the principles, action, indications, and contraindications for use of all modalities in the department
6. Close cooperation with orthopedic, peripheral vascular, plastic surgery, neurology, cardiovascular, occupational therapy, and social service departments
7. Attendance at all staff and departmental meetings
8. During the first year, the resident will attend lectures, demonstrations, and prepare fifty case histories
9. During the 3-year residency, he will miss no opportunity to visit local facilities carrying on similar efforts

Second-Year Program:

1. Undertake research project and clinical evaluations; begin thesis
2. Care of patients
3. Continue no. 6 of first year
4. Prosect lateral half of one human body or equivalent in autopsies
5. Prepare seventy-five case histories
6. Prepare a paper on the physical medicine and rehabilitation "prescription"
7. Prepare a paper on the art of consultation

Third-Year Program:

1. Care of patients
2. Prepare a paper on medical use of isotopes
3. Prepare a paper on amputations, preparation of stump, and prescription of prosthetic appliances
4. Prepare seventy-five case histories
5. Prepare paper on psychologic aspects of rehabilitation
6. Prepare paper on plastic surgery in rehabilitation
7. The entire program will be directed toward compliance with the requirements of the specialty board

The fellowship training program in physical medicine and rehabilitation offered by the Rehabilitation Center of the College of Osteopathic Physicians and Surgeons is as follows: Fellowship is on a 3-year basis. Requirements: D.O. degree, 1 year approved internship, valid California license to practice or eligibility for one.

The fellowship training program includes:

a. Adequate clinical personalized instruction
b. Comprehensive study program
c. Preparation of papers in the specialty field and related subjects satisfactory for publication
d. Required study of the basic sciences utilized in this specialty
e. Prosection of lateral half of one human body or the equivalent in autopsies
f. Completion of one research project and manuscript for thesis
g. Preparation of two hundred case histories

The executive head of the department is responsible for establishing and administering the training program to meet the necessary requirements as set up by the specialty board.

The Fellow spends full time as an employee of the College of Osteopathic Physicians and Surgeons and is assigned to duties by the head of the department.

The Fellow must keep an accurate record of work done and submit this to the executive head of the department for review and verification. This record is to be available for review by the specialty board or its representative.

First-Year Program:

1. Preliminary indoctrination and orientation
2. Basic sciences, as per board requirements, by lectures, tapes, assigned reading, and practical application
3. Written reports of the basic principles in each of the following:

a. Osteopathic manipulative therapy
b. Hydrotherapy
c. Thermotherapy
d. Phototherapy
e. Electrotherapy
f. Therapeutic exercise
g. Ultrasonotherapy
h. Speech therapy
i. Occupational therapy
j. Corrective therapy
k. Physical education
l. Gerontology and geriatrics
m. Public health
n. Electromyography

4. Care of patients at the Rehabilitation Center
5. Written reports on the principles, action, indications, and contraindications for use of all modalities in the Rehabilitation Center
6. Close cooperation with orthopedic, peripheral vascular, neurologic, and cardiovascular departments
7. Attendance at all staff and departmental meetings and all postgraduate courses given by the department and by the American Osteopathic College of Physical Medicine and Rehabilitation
8. Preparation of fifty case histories during the first year
9. Participation in undergraduate teaching in the department as assigned (Skill in osteopathic manipulative treatment is a requirement.)

Second-Year Program:

1. Undertake research project and begin thesis
2. Care of patients at the Rehabilitation Center
3. Preparation of seventy-five case histories
4. Attendance at all staff and departmental meetings
5. Attendance at all postgraduate courses given by the department
6. Participation in undergraduate teaching in the department as assigned
7. Preparation of a paper on an assigned subject
8. Participation, as a voluntary assistant, in the care of patients at the Los Angeles County Osteopathic Hospital, Department of Physical Medicine and Rehabilitation

Third-Year Program:

1. Continue research project and thesis
2. Care of patients at the Rehabilitation Center
3. Preparation of seventy-five case histories
4. Attendance at all postgraduate courses given by the department
5. Attendance at all staff and departmental meetings
6. Participation in undergraduate teaching in the department as assigned
7. Preparation of three papers on subjects assigned by the head of the department
8. Participation, as a voluntary assistant, in the care of patients at the Los Angeles County Osteopathic Hospital, Department of Physical Medicine and Rehabilitation

Having established what is meant by the term "specialist in physical medicine and rehabilitation," I shall next consider what is understood by the term "practice of osteopathic medicine of today." This represents only my personal interpretation. It may either conflict or agree with other viewpoints. Although this paper has no bibliography, every thought expressed is not original with me. I have had years of practical and teaching experience, have read and observed widely, and have actually forgotten the sources.

When Dr. Andrew Taylor Still opened the first School of Osteopathy, or possibly shortly thereafter, he obtained a charter stating (in substance) that his school was to teach osteopathy as an improvement upon the existing system of practice of medicine, midwifery, and surgery. He did not say that all knowledge acquired over the years was to be thrown aside and manipulation alone substituted; rather he said that osteopathy was an improvement. Osteopathy then, as today, gave special emphasis to normalization of structural function by manipulative technics.

Osteopathy or osteopathic medicine is a comprehensive or inclusive school of medicine and has been since its inception. The educational requirements for admission to study, the calendar time, and subject matter of the curriculum have seldom if ever been exceeded by those schools offering the M.D. degree in the same period. Schools or colleges of osteopathy have always taught the current basic scientific knowledge of the day, the mental, the physical, and even the chemical approach to therapy. Early legislation and the enthusiasm and success of many pioneer osteopathic physicians sometimes confused the public into thinking that osteopathy was a school of drugless healing. Some may recall the story of Dr. Still's being asked what treatment he would give for tapeworm and his reply that he would give oleoresin of Aspidium as he had no objections to the poisoning of tapeworms. This is far from drugless, but does indicate that he had little faith in the efficacy of the available drugs of that day, and I believe medical history proves his views were valid.

To me, the "improvement" mentioned in Dr. Still's original charter was paradoxical in that it was both small and immense. The difference was small in that it was a difference in viewpoint toward the patient and an accent upon manipulative methods of therapy. The difference was immense in that it was probably the first real concept of comprehensive medical care.

Dr. Still evidenced his concept of comprehensive medicine by stating that God, Nature, the Supreme Being, or the Supreme Power — whatever name one chooses to use — knew what He was about when He created or developed man; that each individual is different from all others in that he represents the total experience of his ancestors and of himself with environment both external and internal; that he has within his own organism the ability to be healthy if the external and internal environment is within the accustomed or usual range; that small musculoskeletal deviations from the usual, frequently designated as "osteopathic articular lesions," may cause profound and remote disturbances; and that physicians should treat patients and not cases.

A philosophy similar to this extends through the entire curriculum of osteopathic colleges, and I have developed my own personal satisfactory definition by stating that osteopathy is firmly grounded in extensive knowledge of the basic sciences and embraces or encompasses the revolutionary idea of comprehensive medicine as opposed to the older idea of so-called scientific medicine. This definition is used only to clarify my own thinking and teaching and is in no way official.

During the early years of osteopathy graduates were sometimes hampered in their practice by an absence of state laws relative to the practice of osteopathy or osteopathic medicine. As time passed, state laws restricting osteopathic physicians in their practice were

passed in some states. Later, laws with broader practice privileges were passed. Today, in most states osteopathic physicians may qualify for unlimited practice privileges.

Osteopathic medicine of today has, through hard work and excellent care of the patients, attained the position or status Dr. Still must have envisioned when he took out the charter for the first school of osteopathy. It is a demonstrable improvement. The profession may enjoy unrestricted practice privileges and has built and maintains several hundred hospitals which serve to train physicians of the future as well as to give excellent health care to the patients of today. We have well-trained and certified specialists in all special fields of practice. Graduate, postgraduate, and research work is carried on in all of our colleges and many of our other institutions. Osteopathic physicians take care of the health needs of approximately ten million citizens of the United States, or about one sixteenth of the population. In short, the practice of osteopathic medicine of today requires up-to-date knowledge and weighed use of all accumulated information relative to human disease and its treatment. Specialists are consulted where and when necessary. All care, from examination and diagnosis through treatment, is given to the patient (not to a case) and with the over-all thought of comprehensive medicine or osteopathic philosophy in mind at all times.

Thus to me the practice of osteopathic medicine of today represents the utilization of all available knowledge of the basic sciences in the care of patients, balancing insofar as possible the mental, chemical, and physical approaches to therapy, and ever keeping in mind that we only minister, while the body has a natural built-in recovery ability if we can but locate and eliminate what is interfering with normal function.

Having presented a picture of my personal conception of both the specialist in physical medicine and rehabilitation and the practice of osteopathic medicine of today, I shall now discuss the relationship between the two. In both hospital and office practice, the physical medicine and rehabilitation specialist receives and accepts his patients in the same manner as any other specialist.

1. Consultation with recommendations for treatment
2. Consultation with treatment
3. Transfer with full responsibility and care

These are handled as follows:

1. Consultation with recommendation for treatment: The patient and responsibility for care remain with the referring physician. The physical medicine and rehabilitation consultant examines the patient and renders a report of findings, diagnosis, and prognosis and recommends a treatment regimen, briefly outlining the reasons for the suggested treatment. The treatment regimen suggested frequently includes osteopathic manipulative procedures and exercises with which the referring physician has had little experience but which have been found valuable by those who concentrate their attention on this field of practice. Treatment will be administered by the physical medicine and rehabilitation consultant upon request.

2. Consultation with treatment: These patients are often referred for care of a specific problem such as decubitus, inability to ambulate, or care of a stump following amputation. The responsibility for general care rests with the referring physician. The physical medicine and rehabilitation consultant examines the patient, records his findings, diagnosis, and prognosis, and prescribes the treatment of choice for the specific problem. During the course of treatment, if questions of general care arise, the ethical procedure is to contact the referring physician and send the patient to visit him if requested. When the treatment of the special problem is completed the patient is discharged from the service or care of the physical medicine and rehabilitation specialist and returned to the referring physician for other care or dismissal as he may see fit.

3. Transfer with full responsibility and care: These patients are frequently in the "chronic" classification with various types of arthritis, cerebral palsy, multiple sclerosis, residual effects of anterior poliomyelitis, et cetera. The physical medicine and rehabilitation specialist records his findings, diagnosis, and prognosis and institutes the treatment of his choice. During the course of treatment many problems of general care may arise. The physical medicine and rehabilitation specialist is expected to have the knowledge and ability to cope with these problems equivalent to that of a general practitioner of osteopathic medicine in the same geographic area, but he is not expected to possess special knowledge or training in all fields. When a presenting situation is beyond his abilities, he will call for consultation and treatment with a physician who has special training relating to the presenting situation.

Having summarized what I conceive as a specialist in physical medicine and rehabilitation and how I personally view the practice of osteopathic medicine today and the relationship between these two, I would like to add the following:

The specialist in the rapidly expanding field of physical medicine and rehabilitation not infrequently finds himself in the position of acting as the consultant's consultant or the specialist's specialist. It should be clearly understood that he is not nor does he consider himself a superconsultant or superspecialist. His function is to aid all validly licensed physicians in rendering to their patients the best care in the field of practice to which he has given the greatest time and study. Specialists in all fields remark that with patients, staff meetings, and getting a few hours of home life with their families, they do not find as much time as they feel they need or want to keep up with the advances in their own particular field, so calling a physical medicine and rehabilitation specialist in consultation is only a reflection of their own sincerity in trying to render the best possible health service to the citizens of the community in which they practice.

3815 Landfair Rd.

POSITION OF WATER IN THE MATERIA MEDICA

Of all remedial agents in use since the dawn of medicine, water is the only one that has survived all the vicissitudes of doctrinal changes because its rise or fall was always contemporaneous with the rise and fall of intelligence among medical men, among the most eminent of whom in ancient and modern times we find its warmest advocates, especially during the past decades, representing the most enlightened period of medicine.

Enthusiasts had at one time built a system of practice called Hydropathy upon the almost universal applicability of water in diseased conditions. While this fallacy has been demonstrated, the scientific physician recognizes that water may be placed in nearly all the categories of the Materia Medica.—Simon Baruch, M.D., in "An Epitome of Hydrotherapy."

Physical Medicine and Rehabilitation As a Specialty*

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The specialty of physical medicine and rehabilitation is both the oldest and the newest of the specialties. When primitive man lay in the sun to absorb its warm rays, he did not realize he was using heliotherapy, nor did he realize he was inaugurating the practice of hydrotherapy when he bathed his wounds in water from a nearby stream.

The physical approach to therapy was advocated by Hippocrates who recommended hot and cold baths, sunlight, outdoor exercise, and massage. Asclepiades, a Greek of the first century B.C. who settled in Rome, gained much prominence through prescribing fasts, abstinence, massage, active and passive movements, exercise such as walking, riding, or dancing, and bathing.

Since the days of the Greeks there have been three major approaches to therapy—the mental, the chemical, and the physical. The mentalists or vitalists believed that disease of the body was primarily disease of the mind and spirit, that the mind was the dominating factor. They have their counterpart today in the psychiatrists, psychoanalysts, and psychologists. The iatrochemists tried to explain all bodily functions both in health and in disease on the basis of chemical changes or chemical reactions. Strong drugs were prescribed until the time of Hahnemann who recommended diluted drugs. The iatrophysicists tried to explain the functions and problems of the body through the mechanical or physical approach. Although they were unable to explain all of the bodily functions on this basis, they were the precursors of the present-day school of physical medicine and rehabilitation and undoubtedly the forerunners of the osteopathic philosophy of medicine proposed by Dr. A. T. Still in 1872.

Today, according to medical authorities, there are three phases of medicine: first, preventive medicine which came into existence following the revelations of Lister and Pasteur; second, treatment of the acute or presenting ailment; and third, and probably the most important, rehabilitation. Rehabilitation includes all three approaches to therapy, the mental, physical, and chemical, plus the social, the economic, and all other factors with which patients come in contact.

The public has always been interested in a broader concept of medical care than that commonly presented to it. This, osteopathy has provided. Today, with the increasing number of disabled and handicapped because of war injuries, automobile accidents, and increased longevity, there is an even greater need for intelligent and complete care.

The extent of disabling conditions in this country is appalling. Estimates by responsible organizations indicate there are approximately 260,000 blind persons, 2,000,000 people with diabetes, 500,000 with tuberculosis, and over 200,000 amputees who require artificial limbs;[1] and this number is constantly increasing.

Each year automobiles injure more than a million people, many of whom are left permanently disabled. Children who are born with congenital deformities or acquire orthopedic defects from such conditions as poliomyelitis account for another million.[2]

The National Multiple Sclerosis Society reports that there are from 50,000 to 100,000 persons with this disease. More than 750,000 have epilepsy, and about 10,500 new cases of cerebral palsy appear each year. The year 1952 was one of the worst poliomyelitis years this country ever experienced, with 57,026 cases being recorded for the 53-week period ending January 3, 1953.[1]

Each year the state and federal governments spend huge sums of taxpayers' money to maintain people who are unable to work because of disabilities and who thus cannot support themselves or their families.

Not all of the disabled can be rehabilitated, but there are at least 2,000,000 who can be,[1] and we as individuals and as a nation must bring them back as useful citizens and taxpayers. The disabled and handicapped present us with a challenge that is both a responsibility and an opportunity, for today we are in a position to do more to master the disabling effects of illness and accidents than ever before.

Recent advances in medicine have raised the age to which people live, that is, the average life span is increasing. We are becoming a nation of older people with all the physical and other problems which go with advanced years. About 2,000 years ago man's average life expectancy was about 25 years.[1] At the beginning of the twentieth century it was about 49 years in this country. At present the average for our entire population is about 68 years. As our population becomes older an increase in chronic disease is to be expected, and its resulting physical disability will undoubtedly increase correspondingly. In cases of chronic disabilities that are incurable we must depend on rehabilitation to teach these people to live within the limits of their disabilities and to the full extent of their capabilities. We must do more than merely prolong life; we must make life worth living.

The Office of Vocational Rehabilitation of the United States Department of Health, Education, and Welfare, working in cooperation with eighty-eight State Divisions of Vocational Rehabilitation and Agencies for the Blind, completed a study of public assistance cases rehabilitated through the state-federal program of vocational rehabilitation during the year ending June 30, 1951.[1]

It was found that 66,000 persons had been rehabilitated during that year. More than 8,000 of these—or one out of eight—had been receiving public assistance. They had been receiving assistance through the federally aided programs for the blind, for the permanently and totally disabled, for dependent children, and for the aged.

Assistance payments to these 8,000 men and women had been at the rate of about $5,700,000 annually. As rehabilitated, working members of their communities, their earnings are estimated at $14,000,000 in the first year after their rehabilitation. The expenditure of $4,000,000 to rehabilitate them was less than three-fourths of what it would have cost to maintain them for

*This article is based on a presentation before the Fifty-Eighth Annual Convention of the American Osteopathic Association, Toronto, Canada, July 16, 1954. Facts and figures have been brought up to date.

one more year. As contributing members of their communities, they will pay an estimated $1,000,000 annually in federal income taxes alone. . . .

One of the smaller states, for example, reported 69 disabled welfare recipients rehabilitated during the year. Involved in the fortunes of these 69 were 120 members of their families—wives, children, parents, and other relatives—all of whom had been dependent upon public welfare for the bare necessities of existence. Altogether, they had been drawing welfare payments at the rate of $45,760 a year.

It cost less than $14,000 for their rehabilitation. With this single investment in 69 human beings, the annual recurring public expense of more than $45,000 was at an end. They were earning their own way again to the tune of over $133,000 a year in wages.[1]

During World War II, 18,000 amputations were performed as a result of military casualties of the United States armed forces.[2] During this same period, 120,000 civilians lost arms or legs through disease or injuries. About 7 million people are hard of hearing while those who suffer from chronic diseases like tuberculosis, heart disease, epilepsy, or multiple sclerosis total several million. These figures do not include the blind and those who have serious mental or emotional disorders. Unfortunately return to normal life is not possible for most of these patients after routine treatment. The amputees, hemiplegics, and paraplegics; those with severe congenital deformities; and the chronic invalids from heart disease, tuberculosis, hypertension, and diabetes are left with definite residual functional and structural impairments which neither surgical nor medical treatment can eliminate. However, some of these individuals adjust remarkably in spite of their disabilities.

It is obvious that this large group of handicapped and disabled people cannot be rehabilitated by medical measures alone. They must be carefully examined, both mentally and physically, to determine not only the degree of disability but also what latent capabilities they may have which could be developed to enable them to resume their places in society as working, taxpaying citizens.

Every physician is interested in rehabilitation. At present, there are two widely accepted definitions of rehabilitation. However, I prefer to use the broader term that is accepted by professional workers dealing with physically handicapped persons. Rehabilitation, according to this definition, is the restoration of the handicapped individual to the fullest physical, mental, social, vocational, and economic usefulness of which he or she is capable.

The term "physical medicine" includes the employment of the physical and other effective properties of light, heat, cold, water, electricity, massage, manipulation, exercises, and mechanical devices for physical and occupational therapy in the diagnosis and treatment of disease.[3] Physical medicine is the application of the physician's art and his particular knowledge in biophysics to the investigation, diagnosis, and treatment of his patient and to the maintenance of health and the prevention of disease in the community. The physician who practices physical medicine and rehabilitation as a specialty is sometimes designated as a physiatrist. The term "physiotherapy" refers to the use of various modalities such as diathermy, ultraviolet, infrared, and hydrotherapy, while the term "physical medicine" implies the knowledge with which to diagnose the condition of the patient and prescribe properly these various modalities.

It is important for the specialist in this field to be the type of doctor who is both servant to and master of his patient, a physician who looks at each of his problems as a whole. He is one who knows and understands his patient as a human being with mind, body, and spirit, with his particular loyalties, frailties, and inconsistencies, but inseparable from his environment. In fact, he realizes that patients are people.

In osteopathic undergraduate and postgraduate teaching of physical medicine and rehabilitation we must keep in mind the fact that the underlying fundamental is the teaching of good osteopathic medicine. This is especially necessary, for a specialist in physical medicine and rehabilitation should not prescribe or carry out treatment for a patient without examining him any more than a surgeon should operate without first examining the patient. The specialist in physical medicine and rehabilitation must stand for the same firm principles of good practice as specialists in other fields.

When a physician is qualified in the field of general medicine and can add to this the special technics and modalities pertinent to physical medicine and rehabilitation, he is then a specialist in reality and not in name only. He is at the threshold of great new opportunities. He has a heavy responsibility for he holds the key to the solution of medicine's major problem—chronic disease and disability in an aging population.[4]

During the first World War, the term "physical reconstruction and rehabilitation" was first used. About 30 years ago, Dr. William J. Mayo[5] wrote that rehabilitation is to be a master word in medicine. Over 10 years ago Bernard M. Baruch[6] advised the members of the Baruch Committee on Physical Medicine and Rehabilitation:

> to develop the field of physical medicine and rehabilitation, you must first train teachers. Within a few years you will have qualified teachers in this specialty in key medical centers all over the United States.

In 1947, the American Board of Physical Medicine and Rehabilitation was organized. The Board consists of eleven members. Four representatives are from the American Society of Physical Medicine and Rehabilitation; three are from the Section on Physical Medicine and Rehabilitation of the American Medical Association and four are from the American Congress of Physical Medicine and Rehabilitation.[7]

The objectives of the board are:

1. To elevate the standards of physical medicine and rehabilitation, to familiarize the public with its aims and ideals, to protect the public against irresponsible and unqualified practitioners, to receive applications for examination in physical medicine and rehabilitation, to conduct examinations of such applicants, to issue certificates of qualification in physical medicine and rehabilitation and to perform such duties as will advance the specialty of physical medicine and rehabilitation.

2. To determine the competence of specialists in physical medicine and rehabilitation and to arrange, control and conduct investigations and examinations to test the qualifications of voluntary candidates for certificates to be issued by the corporation as set forth by the constitution and by-laws.

3. To serve the public, physicians, hospitals and medical schools by preparing and furnishing lists of practitioners who shall have been certified by the corporation.

4. To do all things necessary or incidental to the foregoing specified purposes.

The Baruch Committee on Physical Medicine and Rehabilitation during 1950 completed its activities in promotion of practice, teaching, and research in physical medicine and rehabilitation and decided to give up its program on April 1, 1951. During its 7 years of existence the Committee stimulated national and inter-

national interest in physical medicine and rehabilitation, established research programs in many parts of the United States, supported three major centers at Columbia University, New York University, and at the Medical College of Virgina, provided fellowships in physical medicine and rehabilitation for more than fifty physicians, and was the major factor in establishing the specialty of physical medicine and rehabilitation on a stable foundation as an integral part of present-day medical practice.[8]

In 1950 a questionnaire was sent to seventy-two deans of medical schools by the Advisory Committee on Education of the Council on Physical Medicine and Rehabilitation of the American Medical Association; sixty-seven answered. One of the chief purposes of the questionnaire was to determine how well graduate and undergraduate teaching in physical medicine and rehabilitation was organized in American medical schools. The following is a brief tabulation of some of the findings:[9]

Medical schools having departments of physical medicine and rehabilitation	37
Medical schools having departments of physical medicine and rehabilitation and also a physiatrist on the staff	31
Medical schools listed as teaching physical medicine and rehabilitation on an undergraduate level	45
Medical schools listing graduate courses in physical medicine and rehabilitation	17
Medical schools having approved residencies in physical medicine and rehabilitation	15
a) Number of residencies available	52
b) Number of residencies filled	27
c) Medical schools having approved residencies but no residents	5
d) Medical schools having residencies completely filled	4
e) Medical schools having residencies in process of approval	5
Medical schools with no department of physical medicine and rehabilitation but attempting to develop one within a reasonable time	16
Medical schools having separate departments of physical medicine and rehabilitation	14
Medical schools having diplomates of the American Board of Physical Medicine and Rehabilitation on the staff	32
Medical schools having heads of departments who are not diplomates of the American Board of Physical Medicine and Rehabilitation	10
Universities which have schools of physical therapy associated with:	
a) The medical school	14
b) Other faculties	5
Medical schools having affiliated schools of occupational therapy	11
Universities contemplating establishment of schools of physical therapy	14
Universities contemplating establishment of schools of occupational therapy	14
Medical schools which do not have a department of physical medicine and rehabilitation and are not particularly interested in developing one	10

It can be noted that at that time about 67 per cent of the medical schools considered it necessary to do some teaching of physical medicine and rehabilitation and/or physical therapy. There were at least forty-five residents in training.

At present there are in this country seventy-five schools issuing the M.D. degree and six schools issuing the D.O. degree, and there are approximately 12,000 D.O.'s and 200,000 M.D.'s in practice. This represents a ratio of about 1:16 which means that about 10 million people put their health problems into the hands of physicians with D.O. degrees.

The medical profession has about 250 diplomates of the American Board of Physical Medicine and Rehabilitation practicing their specialty, and in July, 1955, 21 osteopathic physicians were certified in the field. There is need for many more in both schools of practice.

There are about 5,000 qualified physical therapists in this country, with an estimated 2,500 positions vacant because of lack of personnel.[1] It is estimated that within the next 5 years another 5,000 therapists will be needed. The situation is the same in occupational therapy and medical social work, for various labor unions and other groups are interested in establishing rehabilitation centers all over the country.

There is at the present time an American Osteopathic College of Physical Medicine and Rehabilitation which is affiliated with the American Osteopathic Association. The membership consists of about fifty members and is constantly growing.

At this time there are, to my knowledge, only three osteopathic hospitals having departments of physical medicine and rehabilitation. Residencies should be available in all colleges and many hospitals as we are desperately in need of specially trained men in this service. The College of Osteopathic Physicians and Surgeons has an established Department of Physical Medicine and Rehabilitation and a rehabilitation center.

The Los Angeles County Osteopathic Hospital has a Department of Physical Medicine and Rehabilitation, and in the new hospital plans over 7,600 square feet of floor space have been allotted to this department. It is interesting to note that the architect, who has had considerable experience in drawing hospital plans, insists that this is not enough space.

Osteopathic physicians and surgeons with the proper qualifications are now eligible for fellowship (training) grants from the United States Public Health Service of the United States Department of Health, Education, and Welfare, and the Rehabilitation Center at the College of Osteopathic Physicians and Surgeons offers a Teaching Fellowship in Physical Medicine and Rehabilitation, beginning July 1 of each year.

Under the sponsorship and supervision of Dr. W. W. W. Pritchard, coordinator of Osteopathic Training and Research at the College of Osteopathic Physicians and Surgeons, the College now has a research program functioning. We have an experienced and qualified research consultant, a trained research administrative assistant, and a trained research assistant and project leader. Our present project is titled "Physiological Study of Therapeutic Exercise." The project is financed with funds from outside our profession, and we will spend not less than $25,000.00 annually for research over an indefinite period of years. All projects undertaken will be closely related to osteopathic medicine and especially to physical medicine and rehabilitation.

In spite of all this, the fact remains that the osteopathic profession is in great need of men trained in physical medicine and rehabilitation. It is lagging behind in a field in which it should be leading, for osteopathy has pioneered in the philosophy that the patient should be considered as a whole, in the philosophy of preventive medicine, and in the philosophy that no patient's care is complete until he is again employed in a gainful occupation.

Now, that the public is rehabilitation-conscious, it

is more urgent then ever for us to keep up with the changing times. We can never stand still—we must either progress or retrogress. The only way to coast is downhill, and we cannot afford to do this if our profession is to continue.

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Physical Medicine in the Rehabilitation of the Orthopedic Patient*

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INTRODUCTION

Formal recognition of the specialty of physical medicine and rehabilitation is a very recent development, the American Board of Physical Medicine and Rehabilitation of the American Medical Association having been established in 1949, and the American Osteopathic Board of Physical Medicine and Rehabilitation in 1954. However, the various modalities and principles of physical medicine have been applied for many centuries.

Formalization of training, raising the specialty to its justified position and training individuals in the application of the principles of physical medicine and rehabilitation make up the next large educational project of our profession. This is true because our profession, in its fundamental concepts, parallels the principles of physical medicine more closely than any other segment of the healing arts. This in no way presages or even suggests that physical medicine and rehabilitation will replace our contribution to the healing arts, but it very definitely means that those individuals who have a thorough knowledge of the principles of physical medicine and rehabilitation combined with their knowledge of osteopathy will have within their armamentarium the most advanced methods for caring for the sick and disabled.

Orthopedics, osteopathy, and physical medicine and rehabilitation should be recognized as coming from the same lineage. How close they are is illustrated by the following definitions of each:

Sir Robert Jones[1] defined orthopedics as treatment of injuries or diseases of the locomotor system by manipulation, operation, re-education, and rehabilitation.

The Baruch Committee on Physical Medicine defined physical medicine as the utilization of the physical and other effective properties of ultraviolet and radium energy, heat, cold, water, electricity, massage, manipulation, exercise, and mechanical devices for diagnosis and for physical and occupational therapy.[2]

Kessler[3] defined physical restoration as

> . . . the system of treatment that employs every device and measure to expedite recovery, shorten the period of convalescence and secure for the patient the maximum development of his physical and mental capacities. Physical restoration does not mean exclusive use of the technics of physical medicine, but implies the use of all medical and surgical measures as well as the ancillary services which will restore the individual to the full use of his faculties.

The American Illustrated Medical Dictionary[4] defines osteopathy as

> A system of therapy founded by Andrew Taylor Still (1828-1917) and based on the theory that the body is capable of making its own remedies against disease and other toxic conditions when it is in normal structural relationship and has favorable environmental conditions and adequate nutrition. It utilizes generally accepted physical, medicinal, and surgical methods of diagnosis and therapy, while placing chief emphasis on the importance of normal body mechanics and manipulative methods of detecting and correcting faulty structure.

From these definitions the relationship between osteopathy, orthopedics, and physical medicine can be seen to be very close.

While physical medicine, in its rather broad sense, may employ the use of ultrasonics, electricity, stimulation of muscles, heat, cold, ultraviolet, and other modalities, these should, for the most part, be considered adjunctive to the main and most effective physical medicine measure, that is, therapeutic exercises. The use of therapeutic exercises can be considered the cornerstone of physical medicine and rehabilitation.

In restoration of the physical body, whatever is done is done primarily to restore normal muscular function. Some fundamental consideration should therefore be given to this subject.

Physical medicine in the orthopedic patient is a matter of understanding the normal action, pathodynamics, and principles of re-education of muscles, which eventually means restoration of normal joint function.

In a previous paper,[5] I called attention to the function of muscles, namely, movement of joints, maintaining stability of joints, maintaining posture, and maintaining physiologic and normal metabolism in the body. Now, in this discussion of physical medicine in orthopedics, I shall deal mainly with muscles in their relations to joints. Exercises, to be effective, are performed for the purpose of preventing deformities, increasing functional activity, developing strength of muscles, improving motion in a joint, correcting deformities, and thus aiding the patient to rehabilitate himself as rapidly as possible.

PATHOLOGY OF ACUTE INJURIES

It is quite important that certain fundamental principles be understood with regard to acute injuries, par-

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ticularly fractures, if restoration to normal function is to be had in minimal time with maximum recovery, depending, of course, upon the type and severity of the injury.

When a fracture occurs, the bone has been killed by the trauma; autolysis by ferments furnished by the death of the cells takes place, and there is immediate exudation in the region of the fracture. In addition to this, there are swelling and infiltration which generally reach the maximum in 8 to 12 hours. Thrombosis adds to the edema. Clotting takes place, and exudates leave their residue of fluid, which gradually diffuses toward the surface. The more residue, whether exudate or transudate, the slower and less efficient is the organization of fibrin. Injuries to muscles, nerves, vessels, joints, tendons, and tendon sheaths are present. Together with this there is a certain amount of edema, and within a short time fibroblasts appear in the fibrin clot, which is the beginning of the formation of granulation tissue. The more fluid present, the less effective and rapid is the cell proliferation. Within 48 hours considerable organization takes place.

The growing tissue is infiltrated with the calcium derived from the autolyzed dead bone, either in solution or in a colloid state. The cells forming this tissue are derived from the soft parts of the bone—endosteum, marrow reticulum, and periosteum—from the soft parts around the site of the fracture, and from the lymphocytes infiltrating the part as a result of the inflammatory reaction. Within 72 to 96 hours this mass of cells, while loose-meshed and friable, becomes organized tissue uniting the ends of the bone and the adjacent soft parts. Unless mechanical obstruction exists, such as interposition of tissue, all fractures heal in this manner. In fact, this is the healing process in any wound wherever situated.

In bone injuries, calcium is then deposited in this newly formed living tissue, thus constituting early callous formation. Deposition of calcium has been observed as early as 72 hours after fracture in sections removed from actual fractures. The calcium is apparently derived, for the greater part, from the calcium freed by autolysis of dead bone, and not from the blood calcium. The process then goes on to progressively denser concentration of deposited calcium until the callus becomes hard bone.

With use and with the action of normal stress and strain over a period of months, this bone arranges its lines and channels and becomes histologically normal. It frequently takes a year or more for completion of the process.

In the meantime, the organization of granulation tissue proceeds in the fibrin mesh throughout the affected soft parts and becomes organized tissue within a week. The effectiveness and rapidity of growth of tissue are dependent upon efficient circulation in the parts from which the cells are derived and, as stated above, are retarded and limited by excessive fluid exudate at the site of fracture.

From this pathologic picture there are certain lessons to be learned in regard to physical medicine and the treatment of acute injuries:

1. Prevention of further hemorrhage and damage to the parts is accomplished by immobilization.

2. Cold applied to the localized area prevents further hemorrhage and reduces edema.

3. Prevention of edema by elevation of the part promotes drainage and thus prevents fluid accumulation.

4. Early muscular action prevents degeneration of muscle. During the early period—48 to 96 hours—much can be done to prevent the familiar sequelae. Persistent swelling is the most common cause of disability following fractures.

APPLICATION OF PRINCIPLES OF PHYSICAL MEDICINE

An important physiologic and pathologic consideration is that rest of a part, or bed rest, tends to produce osteoporosis of the skeleton. Calcium is released into the blood stream and may produce hypercalcemia. The major bone-forming stimulus is weight-bearing and stress by muscular action upon bone substance, and any patient with a part or the whole body at rest must be exercised as much as possible within the limits of the disease or injury.

I shall now discuss the use of physical medicine in specific injuries.

Colles' Fracture.—

An excellent example of the use of physical medicine is found in treatment of simple Colles' fracture. If proper methods are used following a Colles' fracture, normal function returns within a reasonable time. When improper physical measures are used, principally muscular exercise, disability is prolonged or recovery may never take place, and permanent disability results.

The following is the procedure in this particular fracture:

1. After diagnosis, proper reduction is essential. No procedure in physical medicine can be expected to overcome or be a substitute for proper reduction.

2. The correct cast is essential, and care should be taken not to immobilize joints which should not be immobilized. In many cases, a hand has been ruined because the cast extended down over the metacarpophalangeal joints, even to the distal interphalangeal joints, or because of too extensive immobilization of the metacarpal joints of the thumb.

3. Immediate exercise of those joints adjacent to the fracture should be instituted. As soon as the patient has recovered from the anesthetic, exercises, consisting of extension and flexion of the fingers, should be done on the hour, every hour. If the elbow is not immobilized, supination and pronation are indicated, as well as flexion of the elbow, in the early stages of the fracture. Exercise of the shoulder joint is also a routine measure. These exercises are important and promote circulation and removal of edema and also prevent degeneration of muscles which starts 48 hours after immobilization. Active exercise of the fingers, shoulder, and elbow should be continued routinely on the hour until such time as minimum edema is present and until the individual is using the hand in the performance of usual duties.

I know of no cast which does not permit contraction and exercise of muscles which are so necessary to eventual function of the joints.

4. Circulation can also be increased by elevating the part.

5. Application of cold in the form of ice packs is routine in my cases.

6. Upon removal of the cast, contrast baths, paraffin baths, massage, and continued use of exercises may be necessary to bring about complete recovery. The test of the treatment in this particular instance is whether or not the individual returns to his previous occupation without any handicap whatsoever.

7. If muscular weakness ensues, it is necessary to proceed further with progressive resistance exercises. It should be noted that progressive resistance exercises

are often necessary to bring about full recovery of muscles and joint function.

The principle of progressive resistance exercises is the use of increased muscular strength against a degree of resistance that calls forth maximum effort. These exercises are of inestimable value, not only in acute lesions but in many chronic orthopedic conditions.

Sprained Ankle Without Fracture.—The patient should be put at rest for 48 hours with the foot elevated and packed in ice. If the sprain is severe a light cast should be applied and the ankle supported. Active exercises of the foot should be instituted, and hot and cold applications should be made in the ratio of 3 to 1. Any bony lesion in the foot or ankle should be corrected, and the patient should be instructed to walk properly so as not to develop poor walking habits as a result of the injured foot or ankle. If pain persists, there is some indication that ultrasonic treatment is of value. Active motion, passive motion, and osteopathic manipulative therapy are indicated to bring about eventual recovery.

Knee Injuries.—Acute injuries are treated as indicated above. Most important in treating knee injuries is to keep the activity of the quadriceps femoris as nearly normal as possible. This is brought about, if the patient is in a cast, by "shrugging" of the quadriceps and, in other injuries, by active exercises such as extension of the leg. Progressive resistance exercises should be used to prevent quadriceps weakness or to strengthen it following injuries or casting, or from other causes. Other modalities of physical medicine to be used in both acute and chronic knee ailments are straight-leg walking, cold packs, rowing machines and other physical apparatus, osteopathic manipulative therapy, and braces. These measures are used to prevent overstretching of the quadriceps and traction of the hamstring muscles.

Low-Back Disorders.—

It is impossible to go into all the various aspects of low-back disorders, but it should be emphasized that the use of progressive resistance and other exercises, along with osteopathic manipulative therapy, offers the most enduring and positive treatment.

No method will relieve low-back sprain more effectively than building strong spinal and abdominal muscles with systematic and graduated exercises. This constitutes one of the most effective means of alleviating the pain coincident to minimal disk lesions and the only method which will prevent the necessity for an operative procedure. The use of braces in orthopedic problems of the low back is of inestimable value, but to utilize a brace without following through with physical procedures including exercises, osteopathic manipulation, paraffin, and other modalities is doing only half the job.

Shoulder Disorders.—Periarthritis of the shoulder, bursitis, and other painful shoulder conditions can best be treated by the use of swinging exercises, a wheel, ultrasonic therapy, hot and cold packs, hot packs, swimming, and correction of osteopathic lesions in the cervical and dorsal areas. These measures should be instituted immediately because the deltoid muscle begins to degenerate within 48 hours when the arm is put at rest.

Miscellaneous Deformities and Orthopedic Disorders.—The use of physical medicine is indicated in other deformities such as those resulting from infantile paralysis, cerebral palsy, arthritis, traumatic or degenerative nerve paralysis, and many others, and many different modalities of physical medicine are used for the rehabilitation of the patient. It can generally be stated that voluntary motion, even a very little, is of more value than any other measure. In other words, if it is possible by patience and care to get the patient to coordinate the brain with the action of muscles in these conditions, many deformities can be prevented and rehabilitation enhanced. The use of underwater motion, heat and cold, electrical stimulation, graduated progressive resistance exercises, voluntary use of the muscles in graduated vocational jobs, and substitution of action of other muscles for weakened muscles are all physical medicine procedures which may be utilized.

PROCEDURES OF PHYSICAL MEDICINE

The following are physical medicine procedures which can be used in various orthopedic disorders.

1. Exercises after disk surgery: straight-leg raising within 24 hours following surgery, thus preventing adhesions around the fourth, fifth, and first sacral nerves
2. Early ambulation and exercise in fracture of spine
3. The use of a whirlpool bath for congestion in extremities following trauma
4. Progressive resistance exercises in postural problems, particularly in lordosis and kyphosis
5. Bicycle riding for bedridden patients in order to develop the tibialis anterior and quadriceps femoris
6. The use of an oscillating bed for patients confined to bed because of orthopedic problems
7. For the arms during bed rest—active resistance exercises with pulleys
8. Exercise of the quadriceps before elective operations for fractured semilunar cartilage.

CONCLUSIONS

General principles have been given which should be followed in dealing with orthopedic problems in acute injuries. The time to plan rehabilitation is from the moment of diagnosis of the injury, thus preventing many of the sequelae which necessitate use of the various modalities of physical medicine.

It is hoped that the combination of osteopathy, physical medicine, and orthopedics will some day be a part of every hospital and that all hospital patients will receive routine treatments in physical medicine which will insure rapid recovery of normal function instead of the prolonged convalescence so prevalent in both orthopedics and general practice.

Physical medicine in orthopedics is an absolute necessity. The principles and their application must be understood by all. Physical medicine is an ever-widening, interesting, and expanding field. The development in this field cannot be ignored, and certainly the greatest usefulness for physical medicine is in the field of orthopedics. Especially should every orthopedic surgeon be thoroughly acquainted with the principles of physical medicine and rehabilitation and their specific application. Upon this largely depends the favorable outcome and the return to usefulness of an injured or deformed patient.

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The Role of Primitive Stresses in Civilized Life*

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". . . man is a product, like so much else, of the play of natural forces acting on the material and under the conditions past and present obtaining on the surface of our planet."[1]

The central purpose of this paper is to sketch out certain patterns of neuromuscular and associated mechanisms, to see how they serve man in his struggles against his physical and social environments, and to point out certain vulnerable aspects of these patterns which frequently demand therapeutic support.

How life came into being on this young planet is still a speculative matter, but we can see in the various forms of life which exist today a variety of mechanisms by which all forms of living things support their lives by obtaining food, reacting to environmental forces, and reproducing themselves.

In animals, the nature of food has apparently conditioned the development of the means of capturing it. Animals which feed by sifting or sucking in small particles of food drifting in currents of water often have a plantlike appearance. Their sedentary habits put no premium on mutations which may have resulted in more highly developed neuromuscular mechanisms. Food which is large, out of immediate reach, and has a means of protecting itself encourages by selection those mutants possessing more highly developed sensorimotor systems and stronger organs for locomotion.

The exercise of strong organs of locomotion demands a large body. A large active body cannot be fed by diffusion alone; it requires specialized systems for taking in, distributing, and storing food and eliminating waste. These systems are integrated and interdependent, and when stimulated by purposeful physical activity, they coordinate harmoniously to make the whole living being an effective organism.

The result in man of lack of stimulation of the locomotor organs and sensorimotor systems by substituting labor-saving devices, the TV dinner, and the contour chair for the level of physical activity for which the human body is designed may be foretold by the life of the sea squirt. As a youth, the sea squirt exercises a well-developed neuromuscular system while swimming in search of choice morsels of food and favorable environments. In middle age the sea squirt settles down and attaches himself to a rock or piling and develops a large gill system, through which he allows food-rich water to pass. His well-muscled tail gradually sloughs away, and he remains a mass of flaccidity.

In man the development of the systems of body regulation and control is so advanced as to give him a large degree of freedom from his external environment. His internal environment is so well regulated that such vital processes as the supply of oxygen to the tissues, the level of sugar in the blood, the acidity of body fluids, and the body temperature are kept constant. This internal constancy is maintained by processes which are automatic and require no conscious attention. Thus, man's higher mental faculties, developed in him by the unique cerebral cortex, are free for other affairs. Little or no conscious attention needs to be paid to the rate of body processes, to the storage of food, or to the regulation of other adaptive mechanisms. Instead, man is allowed the unique opportunity for the full development and ample expression of human personality through the unobstructed use of his intelligence, reasoning, memory, judgment, skills, imagination, and insight.

The constancy of the internal environment is maintained by the harmonious function of the systems of the body. Control is effected by the autonomic nervous system. Its parasympathetic fibers arising from the brain and sacral regions promote digestion and elimination and control the storage of food through the insulin mechanism. Its sympathetic fibers arise from the thoracic and lumbar regions and serve to make rapid adjustments to such emergencies as pain, fear, rage, temperature changes, and lack of oxygen.

The purpose of sympathicoadrenal mobilization when danger is present is to prepare the body so that the constancy of the internal environment can be maintained at a higher level of activity during running or fighting. The resulting increased muscle tonus, perspiration, heart rate, respiratory rate, blood pressure, and the pouring into the blood of epinephrine and blood sugar are all highly useful for severe body exertions to meet the threatening situation. The production and utilization of sympathomimetic substances prior to vigorous effort result in increased muscular tension. The increased muscular tension, in turn, elicits afferent proprioceptive discharges back into the central nervous system. In this manner, a circular self-perpetuating background of activity is provided, and this facilitates the shifting patterns of response as the work is performed.

Increased perspiration, heart rate, respiratory rate, blood pressure, epinephrine, and blood sugar all serve to prepare an optimal environment for hard-working muscle cells. When physical work is performed in the presence of danger, the work is thus facilitated and there is extraordinary strength and endurance. With the danger overcome and the extra epinephrine and sugar metabolized by the exertion of the fight or flight, the muscular tension and the rate of perspiration, heart rate, respiratory rate, and blood pressure return to resting levels and the former balance is restored.

If conditions do not require or permit hard muscular work attended by a violent expenditure of energy when danger is perceived, the elevation of bodily functions to support higher levels of activity is inappropriate and excessive and results in a disorganization of functions and a disharmony of the internal environment. Without metabolic demand, the response is purely an emotional one and the organic changes become side-reactions.[2] These side-reactions persist for hours and days and feed back to affect the function of the central nervous system.

While the loss of balance within the internal environment persists, even though insidious, there is an interference with the higher mental functions: lapses of

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memory, reduction in skill, poorer judgment, and reduction in reasoning and insight. If the depression of mental faculties under such emotional conditions is not understood and accepted, the victim is likely to develop anxiety. The condition may worsen as anxiety leads to muscular tension and the proprioceptive stimuli arising from the widespread contraction of the voluntary muscles cause a massive bombardment of the central nervous system and produce feelings of irritability and restlessness.[3]

If this disorganization is allowed to continue, the overactive autonomic discharges will predispose to circulatory and digestive disorders. *Thus, the very constitutional endowments which make man a robust animal in a savage state may contribute to his deterioration and destruction in the civilized state.*

Perhaps the climate of a heavily populated and highly civilized world will force the gradual extinction of ardent and inventive men and encourage the development of a race of irresolute stoics, but we cannot wait for this kind of solution to the ever growing problem. We must now modify ourselves so that we can exist in the environment we have so modified.

The rehabilitative effects of a camping trip in the wilderness are well known but little understood. Perhaps the return to primitive conditions where the biologic factors, rather than psychologic, social, and ideologic factors, are the determinants of behavior serves in some way to restore the harmonious function of the vegetative systems. At a wilderness camp the necessity for expending nearly all available time and effort in hunting and fishing for food, gathering wood for cooking and for warmth, and arranging shelter for comfort and sleep determines behavior from hour to hour throughout the day. The nervous and endocrine systems are busy serving hard-working muscles and regulating body temperature. Tensions and emotional responses to people and things at camp are purposefully consumed in physical work.

In modern urban living there is an attempt to restore nervous and endocrine harmony by the use of sedative or analgesic drugs or by the use of an anesthetic such as alcohol, self-prescribed. The benefits are only partial and temporary.

The effects of steam baths and massage in relieving tension and emotional states have been demonstrated to be effective therapeutic measures, but the phenomenon by which heat and massage effect relief is not well understood, massage the least. Perhaps the harmony of disordered vegetative reflex mechanisms is restored in some manner by these modalities. The restorative value of heat may lie in its stress upon the temperature-regulating mechanism. The mobilization of nearly all systems of the body in an attempt to lower the body temperature of a man in a steam bath may over-ride in some way the residual tensions and emotional responses due to worry and frustration. The result of a steam bath seems to be that internal harmony is restored and the individual is again free to meet his problems of daily living without tensions and emotional disturbances carried over from previous experiences.

The therapeutic effects of physical exercise may have a similar explanation. Perhaps the mobilization of the body forces to meet the metabolic, circulatory, nutritional, and neuromuscular demands of exercise supervenes in such a way as to reorganize the reflex mechanisms and restore harmony of function. This apparent paradox in which a new stress (exercise or heat) seems to relieve, rather than to complicate, an existing one (emotional tension) needs to be studied.

Related to this subject may be the phenomenon of excess energy in children and their need to "burn it off" through physical activity. This educationally significant observation has also been frequently noted but scientifically ignored.

When these factors are better understood, the rationale for effective programs of hygiene for living in a complex urban society may be more fully developed. An examination of the situation will suggest clear-cut lines of attack to the physiatrist, the pharmacologist, and the psychiatrist. Their services are needed, and the problem has strong implications for action also in programs of school health, physical education, recreation, industrial health, family life education, and in any other area where man is learning to understand himself.

In conclusion, it would appear that the perfected control of our external environment and highly organized community living place us in strangely provocative circumstances in that:

1. We have inherited large active bodies for the exercise of strength and highly refined sensorimotor systems to enable us to capture food which, until recently, was hard to get. Now the body seems to be an obsolete piece of equipment which deteriorates readily from lack of use.

2. We have developed a capacious digestive system to support the energy to procure food. Now energy utilization is so low that foods taken in amounts for which the system was designed are excessive and become stored as fat, which may become a parasite and a burden.

3. We have developed a constant internal environment which has freed our higher mental faculties for the use of reasoning, imagination, and insight. Now conflicts arising from the difficulty in using the unique cortex for expression and communications act to upset the internal environment and reduce the effectiveness in coping with external environments.

4. Air conditioning of our homes, offices, and automobiles may call for the occasional use of steam baths to stimulate our body temperature-regulating mechanisms.

5. Labor-saving devices such as power steering and power brakes and further automation at home and at work may call for regular stretching, muscle-toning, and posture exercises.

6. Protection from friction and shaking may call for frequent massage or vibrator applications.

7. Efficient work organization permitting prolonged quiet sitting and standing in one place may require enforced periods of movement to restore circulation.

8. In general, frequent and regular "primitive" stresses may be necessary for adequate adjustment to "civilized" living. It would seem that at least part of what has been taken out of man's life by civilized society must be put back into it or his health and welfare will be seriously affected.

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The Effect of Unilateral Static Exercises on Blood Pressure*

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INTRODUCTION

In a previous article[1] the effect of unilateral progressive resistance exercises on blood pressure was discussed. Since the inception of that study, static exercise has received much attention in the professional literature, principally as a result of publication of an article by Hettinger and Müller[2] and its whole-hearted acceptance by Steinhaus.[3] The importance that this type of exercise may have in physical medicine for the treatment of patients has recently been discussed by McCloy.[4]

So far, however, the investigations of the Hettinger-Müller theory conducted by Lorback[5] and others have dealt principally with the effects of static exercises on the development of muscular strength and hypertrophy. The comparable effects of static and dynamic exercise on other systems of the body are not clear. In view of the fact that physical medicine and rehabilitation might be prescribed for patients who suffer from hypertension or vascular fragility, it would be of interest to know how the effects of static exercise on blood pressure compare with those of dynamic exercise of approximately equal intensity.

REVIEW OF THE LITERATURE

One of the earliest studies of the effect of static exercise on blood pressure was that of McCurdy,[6] who investigated with a dynamometer the blood pressure of individuals making a maximum back and leg lift. The actual lift lasted about 5 seconds. Before lifting, the subjects had an average systolic pressure of 111 mm. of mercury, and during the lift, of 180 mm. of mercury. The rise in blood pressure was not accompanied by any marked change in pulse rate. Later McCurdy and Larson[7] reported that Karpovich had confirmed McCurdy's findings.

Cathcart, Bedale, and McCallum[8] placed subjects in a sitting position, one arm extended and pointing down and depressing a handle attached to a load suspension rope. A load of 10 kg. was held until the subject was exhausted. The blood pressure of one subject rose from 117/85 to 121/90; that of a second subject rose from 120/84 to 125/93.

White and Moore[9] had their subjects hold their legs extended in a nearly horizontal position while seated in a chair. They reported a marked rise in the systolic arterial pressure, whereas the diastolic arterial pressure was quite variable — rising, falling, or remaining without significant change. They noted that theoretically the effect of isometric contraction of muscular tissue should be to squeeze out a large part of the blood, thereby decreasing the circulatory bed without correspondingly decreasing the amount of circulating blood. The immediate effect would then be an increase in both arterial and venous pressure.

Barcroft and Millen[10] measured blood flow through the calf by recording muscle temperatures thermoelectrically. During static contractions of low intensity the blood flow did not rise much above the resting rate. During static contractions of high intensity the blood flow was impaired, and single groups of muscles seemed to be almost ischemic. These authors suggested that suppression of hyperemia during strong contraction was probably due to the compression of the blood vessels by the contracted muscle fibers and that circulation through muscle appeared to be of no functional importance during strong static work.

Hewlett and Van Zwaluwenberg[11] had their subjects exercise one arm encased in a plethysmograph and found that the blood flow was accelerated from three to eight times the normal rate of flow, although exercise of the opposite arm produced little or no acceleration of blood flow.

Alam and Smirk[12] concluded that under conditions of circulatory arrest there is a postexercise rise in blood pressure due to a passage of reflex nerve impulses from the exercised muscle. These reflex nerve impulses are postulated to result from an accumulation of muscle metabolites which occurs when the circulation is insufficient to prevent their accumulation. While they obtained the arrest of circulation by experimental means (cuff occlusion), they noted that it occurs under natural conditions (static exercise) as well. Their theory has been supported by Korner.[13]

In the course of plethysmographic studies on the arm, Grant[14] observed that when a strong grasping movement was made, the blood was forced out of the forearm by the contracting muscles and the limb volume decreased. After 3 to 5 seconds, however, the limb volume began to increase, indicating that while muscular contraction does compress the vessels, the strength of compression is insufficient to prevent them from dilating to a certain extent under the influence of dilator substances (thought to be metabolites) released from the muscle fibers.

Knox[15] studied the effect on heart rate of exerting a horizontal pull equivalent to 7.5 kg. against a spring held for 20 seconds and then released. He concluded that any such muscular effort was actually composed of two components: a dynamic one, consisting of pulling out the spring, and a static one, consisting of holding the strain. The dynamic component causes a brief rapid rise in heart rate, whereas the static component produces a slow, steady increase in heart rate. The effects of these two components are additive.

Thompson[16] compared the effects on blood pressure of isometric work, as performed by squeezing a grip dynamometer, with that of isotonic work, consisting of a 1-minute bout of exercise on a bicycle ergometer. He found that in the case of isometric work both the systolic and diastolic blood pressures increased sharply during work, whereas isotonic work caused a sharp rise in systolic blood pressure but no significant change in diastolic pressure. Like Alam and Smirk,[12] he suggested that the chief cause of blood pressure changes in isometric work is reflexive in nature, while that involved in isotonic work is chemical.

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Fig. 1. Subject practicing isometric elbow flexion exercises. Subject's arm was placed 100 degrees from the position of the humerus. A tension equal to two thirds of the subject's maximum strength was exerted against the scale and maintained for 15 seconds.

In all of the above studies the blood pressures appear to have been obtained by sphygmomanometric methods. The accuracy of this technic has been subjected to considerable criticism. Steele[17] stated that indirect technics underestimated the systolic pressure by about 10 mm. of mercury (although half of this figure might have been accounted for by the procedure used), but that diastolic pressure could be read to a difference of less than 1 mm. of mercury. Henschel, de la Vega, and Taylor[18] found that auscultatory procedures underestimated standing systolic pressure by 13 mm. of mercury but gave a good approximation of the diastolic pressure. While it must be recognized that the sphygmomanometer technic cannot equal direct intra-arterial methods in accuracy, at least some authorities[19] agree that the difference is usually too small to be significant and that for ordinary purposes the sphygmomanometer is satisfactory.

STATEMENT OF THE PROBLEM

The purpose of this study was (1) to determine the effect of unilateral static exercise on blood pressure as measured by indirect methods on the contralateral limbs of normal, untrained male subjects and (2) to compare the results with an approximately equal amount of unilateral dynamic exercise on a similar group of subjects.

PROCEDURE

The subjects for this investigation were male students of the junior class at the College of Osteopathic Physicians and Surgeons at Los Angeles. All were volunteers and all were free from clinically apparent disease states.

During the subject's first visit to the laboratory, the strength of elbow flexion and arm elevation was measured by means of a strain gauge dynamometer.

To measure flexor strength, the subject stood facing the strain gauge, which was affixed to the floor. He held a stirrup grip with his palm up, his hand in line with his forearm, and his upper arm perpendicular to the floor, close to but not braced against his body. By use of a goniometer, his forearm was placed in a position extended 100 degrees from the position of his humerus. A piece of flexible airplane cable connected the handle with the strain gauge by way of two ball-bearing pulleys. The subject voluntarily contracted his elbow flexors as strongly as possible. Jerking, lateroflexion, backward bending, shifting of weight, movement of the upper arm, or other accessory movements were not permitted. The change in force exerted on the load cell produced a change in its output voltage, which change was amplified electronically and produced as a line on an ink-writing paper recorder. Comparison of the height of this line with that produced by weights hung from the cable made it possible to calibrate in pounds the amount of strength exerted. Since the sensitive element of the load cell moved only an imperceptible distance, this was actually an isometric strain.

Arm elevation strength was measured by having the subject stand sideways, with the arm to be tested next to the strain gauge. In the normal starting position assumed by an individual about to press a dumbbell to arm's length overhead, the upper arm was pendent from the shoulder, the elbow flexed, and the hand turned to midposition. The stirrup handle was placed in the subject's hand and the length of the cable adjusted accordingly. The subject then endeavored to elevate his arm gradually directly upward as strongly as possible. Jerking, lateroflexion, shifting of the hips, movement of the knees or feet, or other assisting maneuvers were not permitted.

On later visits to the laboratory the subject stood quietly for a few minutes before his blood pressure

Fig. 2. Subject practicing isometric arm elevation exercises. A tension equal to two thirds of the subject's maximum strength was exerted against the scale and maintained for 15 seconds.

TABLE I—BLOOD PRESSURE BEFORE AND FOLLOWING PRESSES AND CURLS

Subjects	Before Exercise		After 1st Set Curls		After 2nd Set Curls		After 3rd Set Curls		After 1st Set Presses		After 2nd Set Presses		After 3rd Set Presses	
	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.
1.	112	82	122	90	128	92	126	92	132	90	——	92	122	80
2.	120	80	130	84	110	75	118	84	114	80	124	80	118	84
3.	116	80	122	86	146	88	132	98	136	92	142	92	132	94
4.	112	75	122	70	110	75	115	80	118	82	120	75	118	75
5.	125	80	137	80	140	85	139	84	140	84	141	92	141	90
6.	140	88	——	—	150	78	150	80	——	—	150	82	154	86
7.	110	78	120	78	120	70	122	78	118	68	118	60	108	72
8.	140	98	148	110	148	108	150	108	148	110	148	106	146	108
9.	128	82	142	86	146	88	140	90	138	84	138	82	140	86
10.	118	86	120	86	118	84	118	85	118	82	117	82	118	82
11.	130	88	145	94	144	94	145	90	134	90	130	94	136	92
12.	128	92	120	90	124	80	126	84	130	84	131	90	128	86
13.	130	75	131	70	131	75	132	75	132	75	133	75	132	75
14.	110	84	114	76	114	88	114	88	130	88	120	88	138	92
15.	118	84	116	80	114	84	110	84	115	85	115	80	110	80
16.	125	80	130	85	135	90	135	84	140	95	135	85	140	88
17.	136	85	140	86	150	90	140	90	152	92	130	80	136	86
18.	126	82	140	80	130	78	138	78	134	78	140	78	138	78
19.	132	108	140	122	143	118	148	118	158	110	160	108	162	110
20.	136	84	128	86	142	80	138	90	136	90	134	88	140	84
21.	142	80	148	88	140	88	148	96	150	84	148	82	152	88
22.	120	76	126	82	122	78	120	76	122	78	118	74	118	74
23.	128	88	140	90	138	92	138	88	130	90	140	94	128	88
24.	118	84	120	82	120	84	122	84	124	84	126	82	124	84
A	125	84	130	86	132	86	132	88	133	87	133	85	132	86
D	41		44		46		44		46		48		46	

S.P.=Systolic Pressure; D.P.=Diastolic Pressure; A=Average; D=Difference (Pulse Pressure). The abbreviations are also used in subsequent tables.

was ascertained by use of a sphygmomanometer. The cuff was then deflated but left in position on the arm. To measure flexion, the subject was placed facing a Detectomatic 11S scale suspended from overhead, in the manner shown in Figure 1. By use of a goniometer the subject's arm was placed 100 degrees from the position of the humerus. A piece of flexible airplane cable connected the handle with the hook of the scale. The subject then contracted his elbow flexors until the pointer on the scale stood at the desired figure. Immediately upon releasing the tension, the cuff was inflated and the subject's blood pressure again ascertained. Thus the blood pressure reading was obtained in a matter of seconds following completion of the exercise. A small dynamic factor was present in that a strain of 70 pounds resulted in a movement of almost ½ inch caused by compression of the spring in the scale.

Arm elevation strength was recorded, with the subject standing precisely as described for the measurement employing the strain gauge and then pushing the handle upward until the pointer on the scale reached the desired figure. This position is shown in Figure 2.

TABLE II—BLOOD PRESSURE BEFORE AND FOLLOWING PRESSES

Subjects	Before Exercise		After 1st Set Presses		After 2nd Set Presses		After 3rd Set Presses		After 4th Set Presses		After 5th Set Presses		After 6th Set Presses	
	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.
1.	112	90	122	90	122	90	122	90	124	84	118	100	122	100
2.	136	96	130	96	128	94	134	94	128	94	126	96	136	92
3.	126	70	126	68	110	60	116	70	114	75	114	70	114	68
4.	121	86	121	86	122	90	120	84	139	88	130	90	130	84
5.	134	80	134	74	120	76	128	76	128	74	126	80	118	68
6.	92	70	92	68	110	68	102	70	98	72	90	68	100	72
7.	138	92	144	96	144	94	142	94	142	94	140	88	144	92
8.	126	86	118	84	130	84	132	82	130	82	138	80	136	80
9.	110	84	114	88	120	92	114	90	120	86	114	84	120	88
10.	126	98	130	98	138	96	138	94	136	108	——	—	140	86
11.	124	90	136	94	136	94	134	96	132	90	132	90	134	90
12.	136	70	144	70	138	60	138	70	144	70	140	70	132	70
13.	105	80	108	68	108	70	110	75	108	80	105	75	110	80
14.	120	80	130	85	130	85	138	85	130	80	130	90	130	90
15.	142	90	150	90	180	90	190	94	150	100	146	90	142	92
16.	122	72	132	78	132	76	132	76	138	76	130	76	130	78
17.	122	82	130	88	132	80	130	80	126	82	128	78	124	80
18.	142	110	142	110	142	108	150	108	140	110	150	108	150	105
19.	132	80	134	78	142	78	142	78	142	76	144	78	148	80
20.	120	66	120	68	126	62	128	60	130	66	128	62	130	60
A	124	84	128	84	130	82	132	83	130	84	128	83	129	83
D	40		44		48		49		46		45		46	

TABLE III—BLOOD PRESSURE BEFORE AND FOLLOWING CURLS

Subjects	Before Exercise		After 1st Set Curls		After 2nd Set Curls		After 3rd Set Curls		After 4th Set Curls		After 5th Set Curls		After 6th Set Curls	
	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.
1.	122	92	130	86	128	90	128	90	126	90	128	84	126	84
2.	134	94	130	94	128	102	130	98	130	98	130	100	126	98
3.	126	82	134	70	132	68	128	66	128	66	122	66	124	70
4.	140	90	143	89	148	90	151	91	158	90	142	91	139	91
5.	130	78	130	84	134	88	128	80	130	86	124	86	124	84
6.	100	74	100	74	98	72	108	74	98	70	98	74	94	72
7.	138	92	146	96	146	96	142	94	146	98	140	96	142	92
8.	130	86	138	78	138	78	126	84	128	84	126	84	124	74
9.	108	78	117	84	115	84	115	88	——	—	——	—	110	84
10.	136	86	142	96	138	98	138	98	136	98	140	96	146	96
11.	126	82	120	70	118	78	116	74	114	74	120	76	118	76
12.	128	75	132	70	136	75	140	70	142	75	138	75	132	75
13.	110	70	112	75	115	75	116	85	115	80	118	80	114	70
14.	130	88	132	90	140	91	135	90	130	88	128	88	130	90
15.	130	90	140	90	148	92	158	94	136	98	136	90	136	86
16.	114	68	122	70	122	70	122	70	122	70	128	70	126	70
17.	140	110	150	112	145	112	148	112	142	112	142	112	150	110
18.	128	72	156	84	126	80	124	80	130	76	126	78	132	72
19.	130	88	136	85	142	86	144	90	152	92	138	88	148	86
20.	118	72	118	72	122	68	118	68	122	68	120	66	122	66
A	126	83	131	83	131	85	131	85	131	85	129	84	128	82
D	43		48		46		46		46		45		46	

The blood pressure reading was ascertained immediately after the subject released the load.

In the previous study the subject's blood pressure was determined following each set of a series consisting of three sets of curls and three of presses, a second series consisting of six sets of presses, and a third series consisting of six sets of curls. This general pattern was repeated in the present study.

At our present level of physiologic understanding it is not possible to determine when a given static exercise is exactly equivalent to a given dynamic exercise. The load to be used during this experiment was determined by the fact that during a study of the effects of unilateral progressive resistance exercise,[1] it was noted that subjects took about 15 seconds to complete a single set of five curls or five presses and that the weight which they used was about two-thirds that of the maximum they could handle in a single repetition. To approximate this load, the subjects in the present investigation were required to hold a pull on the scale equal to two-thirds the maximum figure recorded by the strain gauge and to maintain this pull for 15 seconds.

RESULTS

Blood pressure readings before exercise and following three sets of static curls and three sets of static presses are given in Table I. Those before and following six sets of static presses are shown in Table II. Pressures before and after six sets of static curls are recorded in Table III.

TABLE IV—THE EFFECT ON BLOOD PRESSURE OF STATIC AND DYNAMIC EXERCISES

Exercise	Before Exercise		After Exercise		Difference	
	S.P.	D.P.	S.P.	D.P.	S.P.	D.P.
Presses and curls						
Dynamic	117	75	125	70	+8	—5
Static	125	84	132	86	+7	+2
Presses only						
Dynamic	115	74	122	68	+7	—6
Static	124	84	129	83	+5	—1
Curls only						
Dynamic	116	73	125	69	+9	—4
Static	126	83	128	82	+2	—1

The significance of the differences in blood pressures before and after these three bouts of exercise was determined by the Fisher "t" technic. The increase in systolic pressure following three sets of static curls and three sets of static presses was significant at the .01 level of confidence. The increase in diastolic pressure was not statistically significant. The increase in systolic pressure following six sets of static presses was significant at the .01 level of confidence. The decrease in diastolic pressure was not statistically significant. The increase in systolic pressure and the decrease in diastolic pressure following six sets of static curls were not statistically significant.

Observations of the subjects revealed that most of them took a deep breath just before starting their exercise and then held it during the 15 seconds of strain. Various subjects remarked that they found it difficult to maintain the required strain when they breathed because they tended to let the pointer drop simultaneously with exhalation. This suggests that the increase in systolic pressure shown in two of these static exercises probably was not due to the dynamic and static components of muscular effort postulated by Knox,[15] but rather to the fact that muscular effort performed with the glottis closed and breathing halted causes a rise in intrathoracic pressure.

The effect on blood pressure of static exercises of the type used in this study and of dynamic exercise of the type used in the earlier study are compared in Table IV. Comparison of these two sets of figures shows that, in general, both types of exercise tend to be followed by an increase in systolic pressure and a decrease in diastolic pressure. This tendency to diminished diastolic pressures following both dynamic and static exercise is of particular interest in view of the fact that many standard physiology texts state that both the systolic and diastolic pressure increase as a result of exercise. Our own experiments do not concur with this statement, and Karpovich[20] has reported other studies of dynamic exercise in which a fall in diastolic blood pressure was also observed.

The physiologic factors involved in changes in blood pressure during exercise are extremely complex. The amount of blood pumped by the heart during exercise depends upon an adequate venous return, the capacity of the heart to increase its stroke volume, and heart rate. Venous return is regulated by the pumping action of the left ventricle, the massaging action of muscular contractions, and the effect of respiratory movements on the veins of the abdominal and thoracic cavities. Closing the glottis and suspending the breathing, the individual tends to compress the chest and cause the intrathoracic pressure to rise to the point where it interferes with venous return. Ejection of the blood from the heart must be accomplished against peripheral resistance offered by the arteries, and this resistance varies with the degree of vasoconstriction and vasodilatation of the arterioles in various parts of the body.

While White and Moore[9] pointed out that theoretically isometric contractions should immediately increase the arterial pressure, it is probable that the total mass of the muscles used in the present study was not sufficiently great in proportion to the size of the body to exert any noticeable effect through this mechanism; moreover, the work of Grant[14] suggested that at least some circulation through an isometric muscle is restored within 5 seconds from the start of exercise. If anything, it might be expected that static contractions, by partially reducing the venous return through increased pressure on the blood vessels and by eliminating any pumping effect from the muscles, actually interfere with the cardiac output.

The principal difference observed between the effects on blood pressure of different types of exercise was that dynamic exercise decreased diastolic pressure more than did static exercise. These data support the concept that in static exercise there is a reduction in the venous return and thus in the heart output, while the increased frequency of systole causes an increased frequency in the expansion of the arterial vessels. As a result, the diastolic period is shortened and the fall in diastolic pressure is halted at a higher level. With dynamic exercise, the massaging effect of alternate contractions and relaxations of the muscle forces the blood in the veins onward toward the heart. It is difficult to explain a fall in diastolic blood pressure other than by the assumption that it results from vasodilatation caused by exercise.

SUMMARY

Static exercise, which consisted of a subject holding a weight equivalent to two thirds of his maximum strength for a period of 15 seconds, resulted generally in an increase in systolic blood pressure and a decrease in diastolic pressure.

Comparison of these results with dynamic exercise of roughly the same intensity showed that the principal difference was a considerably greater decrease in diastolic pressure in dynamic exercise.

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PHYSICAL THERAPY

Every physician, cognitively or not, employs some physical therapy in practice. The prescribing or administering of an enema or douche, a bath, ice caps, an inhalation or spray, heat —whether in the form of a poultice, a fomentation, or a hot water bag—fresh air, oxygen, exercise—active or passive—all these are but a numerically small and popularly recognized portion of available measures; integrant components of the vast practical integer of physical medicine. Physical therapy includes a far wider range of treatment than is commonly presumed by the uninformed; and it is essentially and adaptably procurable for the general practitioner, surgeon, and specialist. Each one may employ it as restrictedly or as inclusively as his clinical needs indicate; and when his limitations are reached, the physical therapy specialist is then to be confidently relied upon for more extensive and intensive experience to assuagingly resolve many an otherwise hopeless pathologic problem. If "knowledge is that which, next to virtue, truly and essentially raises one man above another," then the physician trained in physical therapy should, without cavil, be justly exalted above all his associates who may lack a knowledge of such an essential adjunct to successful medical practice.—Joseph E. G. Waddington, M.D., in "Physical Therapy: Theoretical and Clinical."

Pathologic Manifestations of the Arteriosclerotic State*

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"Arteriosclerosis" is a broad and inclusive term that denotes many diseases of blood vessels. Perhaps the division of these pathologic entities into three main classes, as done by some authorities,[1,2] is best for clarification and discussion. It becomes very obvious that some such division is a necessity when one attempts to describe the protean manifestations which can result from this heterogeneous group of processes affecting arterial walls.

TYPES OF ARTERIOSCLEROSIS

Arteriosclerosis can be classified as follows:

1. Atherosclerosis
2. Medial arteriosclerosis
3. Arteriolar sclerosis with:
   a. Subintimal hyaline thickening
   b. Elastic hyperplasia
   c. Endothelial hyperplasia
   d. Productive endarteritis.

Atherosclerosis.—Atherosclerosis is that form of arteriosclerosis which is characterized by the deposition of lipoid in the intima of an elastic artery and by intimal hyperplasia over, or upon, this deposit. The lumen of the artery is frequently reduced to a mere fraction of its normal size and volume. The lipoids are mushy and gruel-like. A breakdown of the intima results in an atheromatous ulcer. Calcification of the lipoid may occur with complete loss of elasticity of the artery. These changes result in marked distortion of the heart, the aorta, the brain and, to a lesser extent, other viscera and the extremities.

Medial Arteriosclerosis.—Medial arteriosclerosis, especially with calcification, also termed Mönckeberg's sclerosis, is a disease process in the arterial wall characterized by degenerative changes in the muscular coat, probably in the nature of hyaline and fatty degeneration which is followed by necrosis and then by deposition of calcium in the form of plaques.[1] This, then, is a form of arteriosclerosis affecting chiefly the media, with resultant calcification, and is seen in the muscular arteries such as the femorals, the tibials, the medials, and the temporals and results in a "pipe-stem" palpatory finding. Most authorities feel that this type of arteriosclerosis is purely a degeneration due to wear and tear of aging and that the lumina of the blood vessels are not diminished in size to any appreciable degree. Therefore, pathologic manifestations are probably minimal if present.[3]

Arteriolar Sclerosis.—The third general class of arteriosclerosis is best designated as arteriolar sclerosis or, as preferred by some, diffuse hyperplastic sclerosis. This form of arterial disease affects chiefly smaller arteries under 100 microns in diameter.[1] These are the peripheral vessels of the viscera. The changes in these small arteries, or arterioles, vary considerably in type and distribution. Most prominent is the process of marked subintimal hyaline deposition and thickening or degeneration which occurs in the presence of hypertension. The kidney is the viscus very frequently affected. Changes in the retina are also frequent. In the absence of hypertension, subintimal hyaline thickening is found as an aging process in the abdominal viscera, with the exception of the kidneys, and probably produces few pathologic changes.

A second form of arteriolosclerosis is characterized by elastic hyperplasia in larger arterioles and arteries. Splitting of the elastic lamina occurs. Reduplication of this elastic layer may be so great that a muscular type of artery is converted into an elastic type. This form of degeneration is also seen in hypertension. It is frequently associated with the hyaline degenerative form so that the smaller arteries show the hyaline degeneration while the larger arterioles and medium-sized arteries show elastic hyperplasia.

Some authorities feel that still another pathologic variety exists.[4] Endothelial hyperplasia appears to occur with conversion of the intima to collagen by proliferation of fibroblasts. This occurs in very small arterioles. Again the kidney is the chief visceral target.

A malignant form is also seen associated with hypertension which is characterized by productive endarteritis. This may resemble very closely the endothelial hyperplasia described above or may be necrotizing arteriolitis in which the whole thickness of the vessel wall becomes necrotic and structureless. The brain and the kidney again show the chief pathologic manifestations.

This classification is extremely brief, and the descriptions are superficial and sketchy, but it does serve to segregate visceral changes from one another and allow a more orderly discussion.

CHANGES IN ATHEROSCLEROSIS

Atherosclerosis produces thrombosis and embolism of arteries. The atheromatous plaque as it enlarges with the accumulation of more and more lipoid eventually undergoes ulceration with loss of intima. Tissue juices are liberated, and these aid in the coagulation of blood, especially in the presence of platelets which have become adherent to the roughened surface. The elevation of the plaque also creates minor disturbances in the flow of blood or eddies which aid in the deposition of platelets and precipitation of fibrin, or the plaque may produce weakening of the arterial wall with resultant outpocketing under the influence of the blood pressure, again with small but abnormal currents developing in the passing blood stream. Thus, many of the factors necessary for clotting of blood in the heart or arteries are provided and a thrombus develops. Bits of this blood clot may then break loose and float in the blood stream until they reach a vessel in which they are too large to pass and become impacted. Embolization then results in infarction or death of the zone of tissue supplied by the vessel which has been occluded. The gruel-like material and bits of disintegrating intima may also contribute to embolization.

Atherosclerosis affects the heart by reducing the blood supply to the myocardium either gradually or abruptly. Atheromatous plaques most frequently involve and narrow the anterior descending limb of the left coronary artery and the right coronary artery before its bifurcation. In either location, large areas of myocardium are involved. More important, in some instances, is the fact that the first and second perforating branches of the anterior descending limb of the left coronary artery supply the atrioventricular node and

*Presented at the Fifty-Ninth Annual Convention of the American Osteopathic Association, Los Angeles, July 18, 1955.

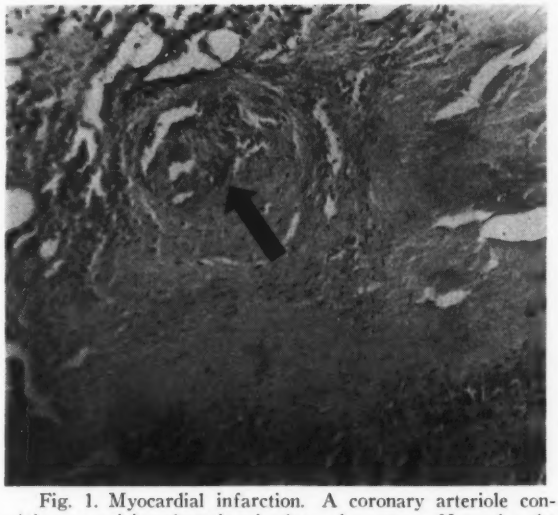

Fig. 1. Myocardial infarction. A coronary arteriole containing organizing thrombus is shown by arrow. Note also the necrotic muscle at upper right and the surrounding inflammatory cell invasion.

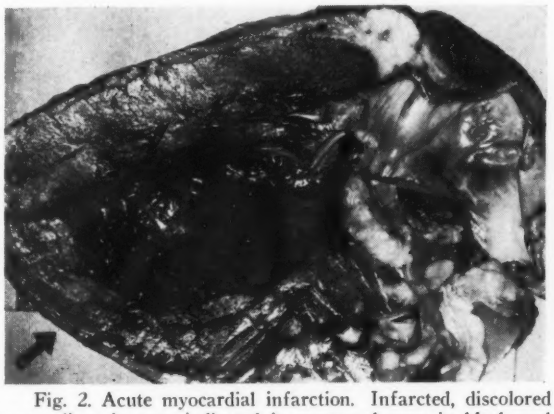

Fig. 2. Acute myocardial infarction. Infarcted, discolored myocardium in area indicated is suggested even in black and white.

the bundle of His.[5] If the atherosclerosis results in ischemia sufficient to destroy the atrioventricular node, cardiac arrhythmia results, possibly with ventricular fibrillation, and death rapidly ensues. Or, atherosclerosis without occlusion can cause hypertrophy of the heart by ischemia of the myocardium with resultant stretching of undamaged fibers. This results in their hypertrophy,[6] and infarction of the ischemic area occurs.[7] In this instance a markedly hypertrophied heart may be found showing numerous infarcts or areas of fibrosis, and the coronary vessels will show plaques in their walls but no occlusion.

Much more frequently, occlusion of a coronary vessel by a thrombus or embolus is found. This results in complete loss of oxygen and nutrients to the affected areas, and death of myocardium occurs to an extent dependent on the size of the vessel and branch, or branches, involved. If the area is massive, and especially if the neuromuscular mechanism is destroyed, death is almost immediate. The heart under such circumstances will show only the thrombus or embolus occluding the atherosclerotic coronary vessel or vessels.

If, however, the area affected is small and there are sufficient anastomotic vessels to limit it, life continues while the infarct develops, undergoes necrosis, and heals, all other factors being equal. In 5 or 6 hours death of the cardiac muscle fibers becomes microscopically evident. A change in staining characteristics occurs with degenerative nuclear changes.

Hemorrhage of minor nature occurs subsequently. Polymorphonuclear cells invade the area in about 24 hours and become numerous in about 4 days. New capillaries begin to grow into the infarct at about 4 days when necrosis is marked. Macrophages become numerous during the second week, and fibroblasts may be noted. Collagen becomes prominent at 3 weeks and reaches a maximum at 6 weeks. By the end of the second month, contraction of collagen has occurred with the formation of a dense scar (the speed of healing varies somewhat with the size of the infarction). During the development of the infarct and anastomotic channels, as mentioned above, disturbance of the visceral pericardium results in pericardial adhesions. Additional capillary anastomoses from the parietal layer form. Thus, an infarcted heart, in addition to the occluded vessel, will many times show an area of engorgement, necrosis, and discoloration, or an area of scarring beneath a patch of pericardial adhesions.

Complications of infarction may occur. If, in the process of degeneration and necrosis of the heart wall, the entire thickness of the myocardium is involved, rupture of the heart may occur with hemorrhage out into the pericardium, resulting in cardiac tamponade. The rupture may be a small opening or a large jagged tear. A second complication is that of aneurysmal dila-

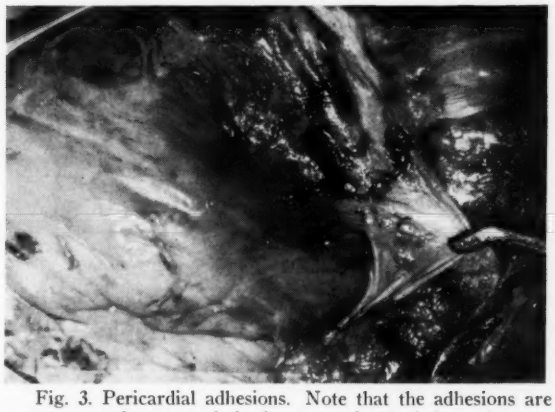

Fig. 3. Pericardial adhesions. Note that the adhesions are present over the apex of the heart previously infarcted.

Fig. 4. Hemopericardium in rupture of the heart due to acute myocardial infarction. The pericardium has just been entered, and blood is beginning to spill from it.

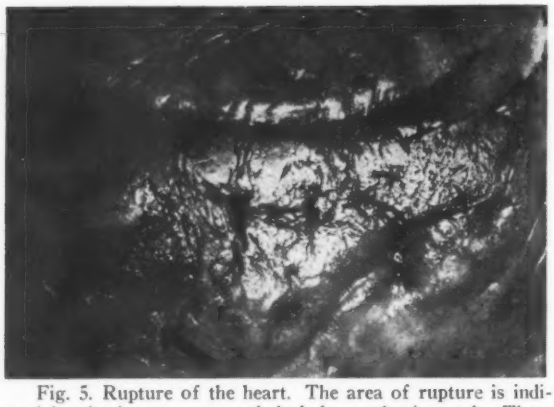

Fig. 5. Rupture of the heart. The area of rupture is indicated by the large arrow and dark hemorrhagic patch. There is no distinct tear in this instance. The site at which the thrombus was found in the coronary vessel can be seen at the upper right.

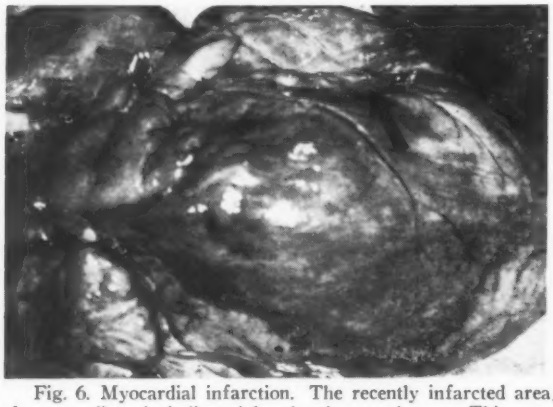

Fig. 6. Myocardial infarction. The recently infarcted area of myocardium is indicated by the depressed area. This area would balloon outward under the influence of blood pressure during life.

tation due to ballooning outward of the damaged and necrotic wall. This causes eddies in the blood with a tendency toward the development of a thrombus, and the degeneration and disintegration of the endothelium result in adherence of platelets and precipitation of fibrin. Thus, a thrombus of splintlike nature forms over the aneurysm. This portion of the wall may then go on to complete healing and fibrosis, or the thrombus may break loose and result in fatal embolism. Pericardial adhesions may form upon the aneurysmal area. These may restrict cardiac action to some extent, but probably, as above, they help replenish the blood supply of the adjacent area to some degree. A third complication might be considered to be progression of the infarction due to a building up of the thrombus and further gradual occlusion of the coronary vessel towards its orifice or further embolization from a thrombus or ulcer. Systemic embolization is the fourth complication. It may be due to cardiac arrhythmia with mural thrombosis following infarction or due to the breaking loose of a thrombus in an aneurysm. The lungs are most frequently involved. Kidneys, spleen, and brain are also affected frequently while intestines and lower extremities are less often involved.

The aorta is very frequently involved by atherosclerosis. Many times it becomes a calcified, pipelike structure; more frequently, areas of atheromatous ulceration form.

Thrombosis and embolization may occur in the kidneys, but thrombosis or embolization of the femoral or popliteal arteries is more frequent. The more advanced the destruction of the intima, the more often the media becomes involved, with loss of strength due to the necrosis and marked dilatation. This dilatation may be quite diffuse, or it may be quite localized or saccular. The aorta in its abdominal portion frequently shows saccular aneurysmal dilatations.

Aortic atheromatous ulcers are responsible for other changes. The media beneath such an ulcer, when subjected to the increased blood pressure of effort, may break and result in intramural hemorrhage from damaged or torn vasa vasorum.[8] Thus, the various layers of the aorta are "dissected" away from one another. This dissection, or separation of layers, is then extended by the pressure of the intra-aortic blood stream. Spontaneous rupture of this type most frequently occurs in the ascending aorta immediately above the aortic valve. Dissection may occur from these usually annular tears, down into the thorax and pelvis, with death due either to shock or exsanguination if the adventia gives way. Dissection of this type nearly always contributes to the abdominal aortic aneurysm and may result in exsanguination as well. However, in the latter case, thrombus formation is as frequent, with splinting and/or embolization of the lower extremities.

The cerebral vessels are particularly prone to atherosclerosis. The circle of Willis is almost invariably affected to some extent in the elderly. Plaques or

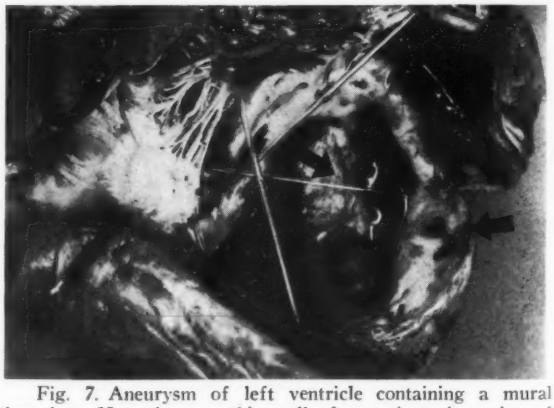

Fig. 7. Aneurysm of left ventricle containing a mural thrombus. Note the very thin wall of scar tissue in region of arrow on the right.

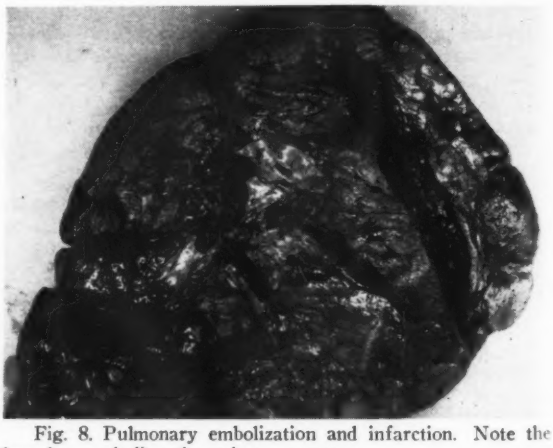

Fig. 8. Pulmonary embolization and infarction. Note the thrombus occluding the pulmonary artery.

ulcerations with endothelial damage, altered and slowed circulation, and deposits of platelets result in frequent thrombus formation. Bleeding then occurs into the brain substance from collateral vessels.[9] Rupture of an atherosclerotic vessel is one of the rarest of phenomena. Arteriosclerotic obstruction without thrombosis with apoplexy is also quite rare. Atherosclerotic aneurysms, either saccular or fusiform, are also rarely responsible for hemorrhage or rupture.

In the extremities, especially the femoral arteries and their branches, atheromatous plaques frequently develop. Atheromatous ulceration and/or formation of thrombi upon such a plaque results in free-floating foreign bodies or emboli which become impacted distally, perhaps in one of the arteries supplying the great toe or the like. Gangrene then occurs. This process is especially prominent in diabetic patients.

CHANGES IN ARTERIOLAR SCLEROSIS

Arteriolosclerosis associated with hypertension, previously defined, results in diminution in the size of small peripheral arteries of the viscera. To supply the same quantity of blood to the visceral parenchyma, against increased peripheral resistance, the heart (especially the left ventricle) must overcome a high pressure in the arterial system before it can expel its contents. This increases the work load of the heart by 40 to 50 per cent.[10] Concentric hypertrophy occurs in the left ventricle. The wall may thicken from the average normal of 1.5 cm. to 2.5 to 3 cm. The weight of the heart may be doubled or even tripled, reaching 900 grams.[11] Bulging of this hypertrophied ventricle into the right ventricle occurs. Fibrosis of the mitral and aortic valves, coronary atherosclerosis, and myocardial fibrosis many times accompany these changes. Outstanding is the firm, thick left ventricle which makes up most of the heart.

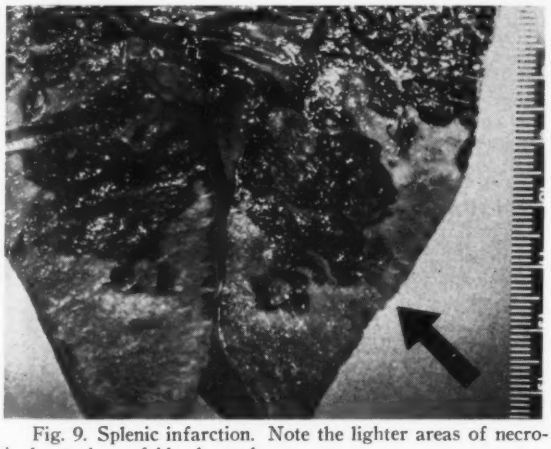

Fig. 9. Splenic infarction. Note the lighter areas of necrosis due to loss of blood supply.

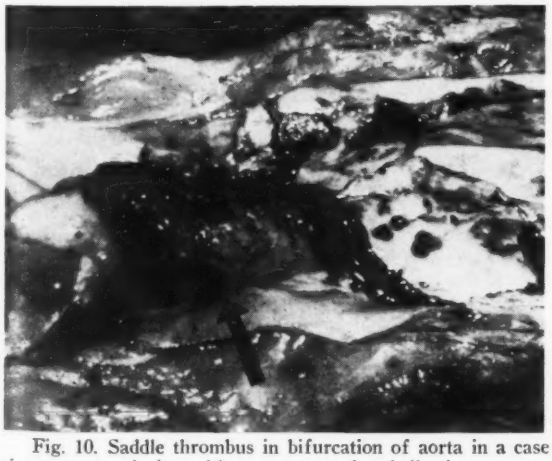

Fig. 10. Saddle thrombus in bifurcation of aorta in a case of coronary occlusion with aneurysm and embolization.

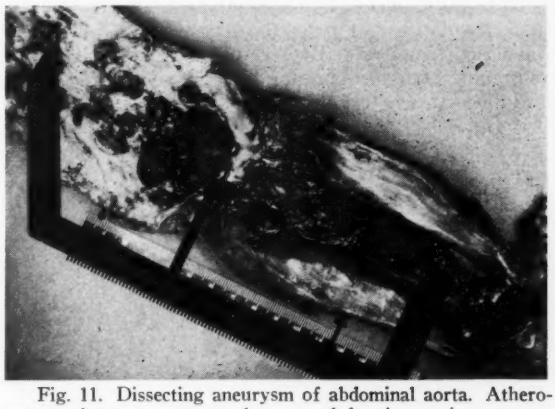

Fig. 11. Dissecting aneurysm of abdominal aorta. Atheromatous ulcers are seen to the upper left. A rent is seen centrally. The smallest arrow indicates the tremendously thickened aortic wall due to thrombosis within the dissected layers. A thrombus is also seen upon the intima within the aorta.

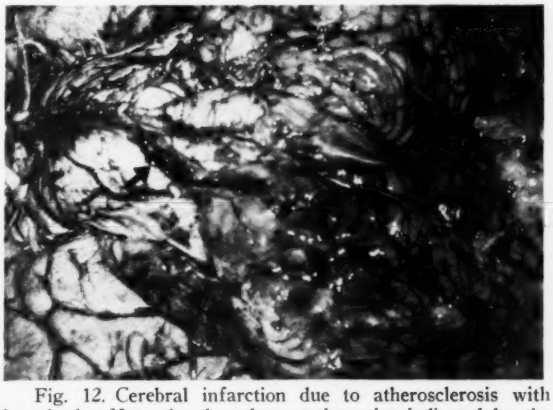

Fig. 12. Cerebral infarction due to atherosclerosis with thrombosis. Note the thrombus at the point indicated by the arrow. This is the basilar artery. Note also the loss of detail due to necrosis of the cerebellum as seen centrally and to the right.

The brain in arteriolar sclerosis associated with hypertension shows atherosclerosis of the basal vessels almost invariably, but true arteriolar sclerosis is also found in the smaller arteries. The brain itself varies in appearance with the degree of the disease. Early there may be little or no change in appearance. Arterial spasm may result in symptoms, but because the anoxia is reversible, infarction or hemorrhage does not occur.

Later in the disease, spasm of greater degree and duration results in frank infarction, hemorrhage, or any and all combinations of the two processes. Infarction is characterized by an area of softening which may reach liquefaction. These areas are very frequently in the deep portions of the cerebrum and are found only upon transection of the brain. After a degree of healing has occurred, a shrunken, dirty-yellow zone of gliosis surrounds a cystic space or spaces, and these spaces may contain yellow serous fluid.

Spasm of the smaller cerebral arteries (arterioles) may also result in hemorrhage. If spasm is partial or

has produced complete occlusion followed by hyperemia, the damage of ischemia or the anoxia allows the walls of the small blood vessels in the area to leak blood or become frankly necrotic. Hemorrhage easily occurs into the soft cerebral substance.[9]

The recent cerebral hemorrhage shows grossly as an area of bright red blood. It is most frequent in the corpus striatum and lateral periventricular regions. In the latter instance if there is damage to the ependyma, hemorrhage into the ventricles occurs and may be seen as a bright red cast of this cavity system. Subpial accumulations of blood are common. Subarachnoid hemorrhage may accompany massive lateral intraventricular hemorrhage but is not common.[12] The spinal fluid may thus be frankly bloody.

Fig. 13. Massive hypertrophy of the heart in hypertension. Note that the apex lies far to the left of the midclavicular line.

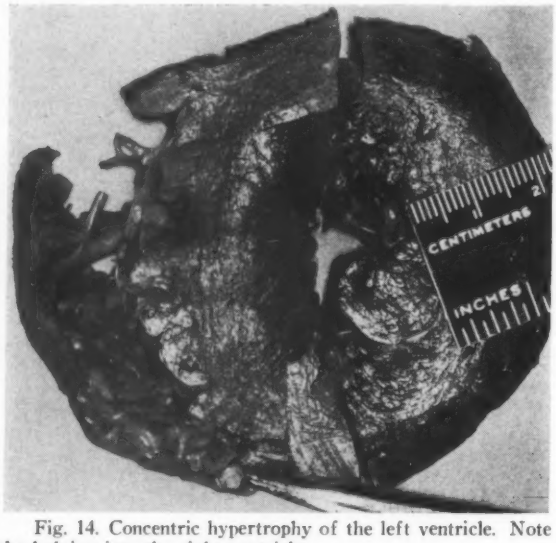

Fig. 14. Concentric hypertrophy of the left ventricle. Note the bulging into the right ventricle.

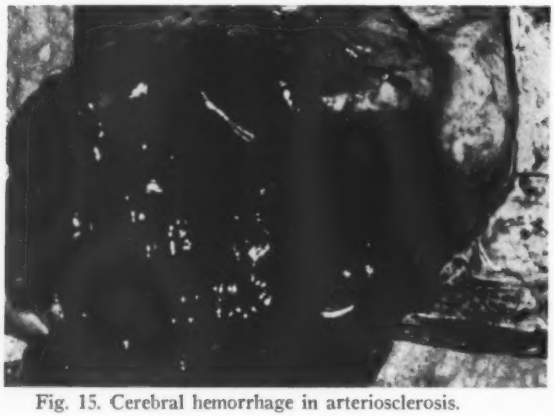

Fig. 15. Cerebral hemorrhage in arteriosclerosis.

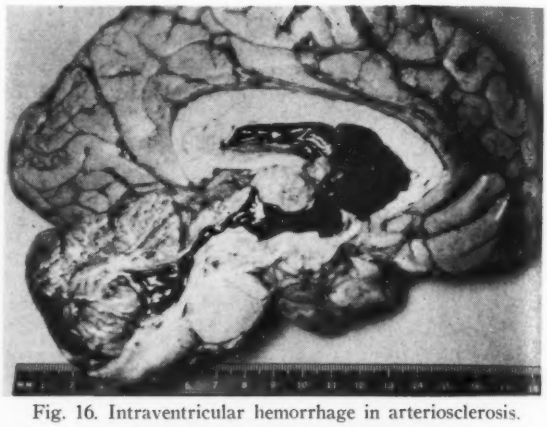

Fig. 16. Intraventricular hemorrhage in arteriosclerosis.

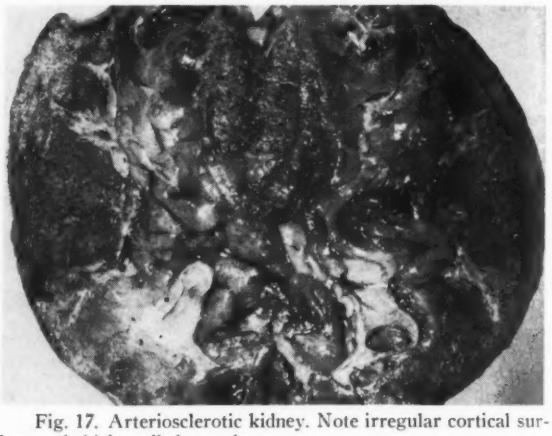

Fig. 17. Arteriosclerotic kidney. Note irregular cortical surface and thick-walled vessels.

The healing or healed lesion of cerebral hemorrhage is a shrunken, depressed, or cystic dirty-yellow structure. The meninges overlying it may be cloudy and opaque. The cerebrospinal fluid may be a distinct yellow or yellow-brown. Systemic effects are the well known hemiplegia, paraplegia, or areas of somatic muscular weakness or sensory distortion of a temporary or permanent nature, the latter accompanied by atrophy and deformity.

Arteriolar sclerosis occurring in the cerebral vessels may also be manifested in the retinal arteries. These vessels show spasms, branching at acute angles, increased tortuosity, alterations in caliber or "beading," loss of translucency, and a pallor giving a silver wire appearance.[13] Later, compression of veins by a crossing artery is seen, and grayish areas of degeneration or streaklike or punctate hemorrhages of the retina itself may result.

The kidneys undergo many changes in arteriolar sclerosis. In the absence of hypertension, this appears to be an aging process and is frequently termed "senile nephrosclerosis." The kidney is of normal size but shows adherence of the capsule upon patchy areas of depression and scarring. These are frequently wedge shaped. Small cortical cysts may also stud the cortex.[14]

(Continued on page 642)

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WHEN YOU GO TO THE CONVENTION!

One unusual experience awaits the A.O.A. convention visitor to New York City—a visit to the Osteopathic Hospital and Clinic, unusual because the institution is not one, but two! Again it is unusual because decades ago, decades that reach back within the century's first, men dreamed dreams and saw visions: there were Riley, Wanless, Whitcomb, Fleck, Green, and Thomas Thorburn, to name but six of the many, some of whom have been taken and some of whom remain to rejoice in two buildings of stone and steel and bricks and mortar.

The two units of the Osteopathic Hospital and Clinic of New York City—the one, the LeRoy Hospital, the inpatient division at 40 East 61st Street, and the other, the Osteopathic Clinic, the outpatient division at 205 East 20th Street—are much more than two excellent structures in a city crowded with the greatest buildings of the earth. They constitute a vital and living project in which men live again, and one nurtured and developed to grow greater month by month through the continuing efforts of a hundred or more osteopathic physicians who work in either or both units. And this is not to mention the devotion of many laymen, without whom they would have failed in earlier years. Doctors and laymen alike resolve that this accomplishment is but the earnest of a day to come when the osteopathic approach to the problems of health and disease shall be made much more widely available in this most amazing city of all time.

When the LeRoy Sanitarium was reopened as a unit of the Osteopathic Hospital and Clinic of New York City in the spring of 1954 it was pointed out editorially in THE JOURNAL that the opening of the first osteopathic hospital in New York State was much more than a matter for state and regional pride—no longer was a world center and the hub of Western civilization to be without total osteopathic care. After 2 years of increasingly successful operation, the truth of the statement is manifest. And it is more true because LeRoy has not lessened the operation of the East 20th Street Clinic where thousands of patients have received diagnostic study and health care of such type and character as is available at no other institution in greater New York, no matter how vast the place nor how extensive the facilities.

The New York osteopathic profession grew slowly but it grew strong. It crawled before it stood upright, and it walked before it attempted to fly. And its first step was taken in 1914 when the original Osteopathic Clinic of New York City was granted a license by the State Board of Charities in spite of medical opposition. The second step came in 1927 with the construction of a new three-story building to house the Clinic at 205 East 20th Street, its present location. This excellent building and the service rendered there were no flash in the pan. The third step was the acquisition of the LeRoy Hospital. These distinctive organizations are described in greater detail in the June FORUM, as is the unusual 50-year-old legislative battle leading to full licensure in New York State in 1946.

It may seem strange that THE JOURNAL and THE FORUM should again lay so much emphasis upon the importance nationally of what functionally are not only regional but, indeed, local institutions. After all, osteopathic hospitals are no longer news in the United States. Their number is increasing so rapidly that a million dollar project has become almost commonplace except to the area that it serves. Redevelopment of older hospitals and doubling of facilities are such frequent happenings that THE FORUM has lost the race in its attempt to give the profession full reporting on osteopathic institutional growth. But the project of the Osteopathic Society of the City of New York is much more than a local, district, or state affair. It is not what meets the eye that counts; it is a reach that exceeds the grasp, the reach that extends beyond the things of self, beyond the needs and desires of groups of men, to encompass a totality of achievement representative of the finest hopes of all men.

The accomplishments of the Osteopathic Hospital and Clinic of New York representing a 42-year fruition are nationally noteworthy, but more than noteworthy is the potentiality inherent in the fact, and part and parcel of a dream unfinished. For what has been done in New York City is but the beginning. The seed planted so many years ago has proved viable, and its development and growth are oak-like in character.

The significance of the two units of the New York Hospital and Clinic as now developed lies in its possibility as an initiating force resulting in an osteopathic graduate center in New York City. There is no place in the modern world so richly fertile for graduate education of this profession. While such education should be eminently practical with unlimited opportunities for professional study in the field of general practice and specialty advancement, it could be much more.

The future development of the osteopathic profession must be not only in breadth, but in depth; it must

concern itself not only with the development of medical skills and technics but with these seen in dissent to their limited objectives, stupendous as have been their achievements. Graduate study in osteopathic medicine must be able to bring to its students an awareness of the nature of osteopathic medicine presented in contradistinction to the nature of modern medicine. No group is better able to make this contribution than the continuing osteopathic membership of New York City and its environs.

Such a graduate center should afford peculiar advantages to leaders of the osteopathic movement apart from the questions of purely technical skills. Osteopathic educators, administrators, and organizational leaders in this world educational center would be exposed to a grounding in leadership that will make for medical statesmanship—an exposure to a wide spectrum of leaders apart from those strictly professional. The osteopathic movement in medicine would have no truck with a policy that has long characterized medicine—one of smug isolationism, monopolistic practices, and a sense of infallibility. Graduate education in osteopathy would thereby not only be assured additional opportunities for scientific and professional development, it could assure an experience in scholarly training which would place leaders in the profession in the vanguard of the health movement.

These are some of the basic reasons why many convention guests should acquaint themselves with the long-nurtured project of the Osteopathic Society of the City of New York and its achievements. Osteopathic history is being made there. There is no section or sector of our profession that would not benefit from the experience of a visit to these institutions. It will be an inspiration leading to the visitors' greater growth, and an experience in itself that will make a convention trip a worthy one.

THE JOURNAL but emphasizes the invitation of the Local Executive Committee of the Osteopathic Society of the City of New York—"We welcome you and your family to visit with us for we believe the experience will be for the benefit of all concerned."

A PART OF THE PICTURE

In addition to the Osteopathic Hospital and Clinic of New York there is a third osteopathic institution in New York City that cannot be visited by the 60th Annual Convention-goer but which should be known to him as well as to the doctor who stays at home. The institution cannot be visited for the simple reason that it is housed in no building, although as an organization it is an outcropping of the spirit which has vitalized the New York City profession from its beginning. And it is one of the forces which will help to transform osteopathy in the East into a national factor in the profession's continuing growth and development. This "body" is The Foundation for Research of the New York Academy of Osteopathy. Organized in 1952, the Foundation stems directly from the New York Academy of Osteopathy, which, of course, is a constituent body of the national Academy of Applied Osteopathy.

What is the purpose of this body? Its charter, granted by the state of New York, states clearly that the Foundation was organized "exclusively for charitable, scientific, and educational purposes." It proposes to direct itself toward furthering knowledge of the osteopathic movement and the application of such knowledge. A study of its activities for the last 4 years reveals that it has done just that thing, carefully, considerately, conservatively, neither showing any sense of provincialism nor directing its efforts purely locally. The Foundation for Research is a geographically centered body but its direction is profession-wide.

Does the Foundation merely represent the latest of the several osteopathic research promotion groups which have come and gone through the years, having served for a brief period a useful but sharply limited purpose? The fact that this seemingly realistic and practical question has been asked actually denotes a lack of realism! Too many members of the osteopathic profession do not know that osteopathy is coming of age, and too few are acquainted with the breadth within which it moves today. The Foundation represents a maturity which too many doctors are unaware that the osteopathic movement possesses.

A year and a half after the Foundation's incorporation THE JOURNAL reported editorially on it at some length (Of Profession-Wide Significance, December, 1953). A report of the First Research Conference held under its auspices was made a matter of record in May, 1954 (JOURNAL editorial, Men and Events). In April, 1955, the concluding editorial on the Cole thesis on research and education in osteopathy set forth the Foundation's possible role in research and education in osteopathic medicine today.

The place of The Foundation for Research can be best understood if it is seen as growing out of the dream and vision of the New York City profession for a half century. It is another way station toward goals that have but begun to be realized and objectives only now being clearly seen.

In December, 1953, THE JOURNAL emphasized that "The Foundation was born out of realism" and that it had come into existence "in frank recognition that the furtherance of osteopathy through education and research requires large funds." And more specifically:

> The New York City area geographically is a center of fund-raising potentiality and activity. Organized osteopathy needs the advice and help of local representatives in the area who are intimately acquainted with existing possibilities there and the methods of their development. It is not enough in this day of countless legitimate calls upon finance that a project is worth while and should have support—it is vital that the technics of project presentation be correct. If the approach is not right the project itself will not get a hearing. Although fund raising from private sources has become an almost scientifically analytical procedure, an opportunity to gain the necessary hearing is brought about most often by personal approach, backed by the integrity and selfless high aims of known individuals. Modern accomplishment is based upon law and order, but its springs of action remain concealed within human appeal.

What is the make-up of The Foundation for Research? The Foundation is made up of three groups of members: General members, fifteen in number, who are leaders in one field or another; ex officio members,

who are the President of the American Osteopathic Association, and the presidents of the Academy of Applied Osteopathy, Eastern Osteopathic Association, New York State Osteopathic Society, Osteopathic Society of the City of New York, and New York Academy of Osteopathy; and Fellows, not more than twenty in number, who are elected from the membership of the New York Academy of Applied Osteopathy. Management of its affairs is in the hands of a Board of Directors of nine members. The president currently is Dr. W. Kenneth Riland, the vice-president is Dr. J. Marshall Hoag, and the treasurer is Mr. Maxwell H. Tretter. The officials are residents of New York City and its environs and, with the exception of Mr. Tretter, are practicing osteopathic physicians.

In what way is The Foundation for Research an integral part of New York City osteopathy, since it relates its purposes to the entire osteopathic movement? Actually, the Foundation stands in a strongly reciprocal relationship. Many of its leaders are closely identified with the total project of the Osteopathic Hospital and Clinic of New York City. Many of these same leaders found their inspiration in the splendid men, living and dead, who were the genesis of the profession's achievement thus far in New York City. In the preceding editorial these achievements were referred to as "the dream unfinished." Also referred to was the long-held hope that the Osteopathic Hospital and Clinic might find its next fruition in a graduate center located in New York City.

It seems inevitable that The Foundation for Research will find as one of the tasks the inspiration it can give and the aid it can render to the Osteopathic Society of the City of New York, the Osteopathic Hospital and Clinic, the profession of New York State, and the New York Academy of Applied Osteopathy (its sponsoring body). The half-century history of osteopathy in Greater New York in itself is a miracle of sustained purpose crowned by tangible victories. It cannot be defeated now. But any estimate of its future must take into account the part to be played by this latest group to grow out of soil long proved fertile.

The Foundation for Research, even though it possesses no buildings and cannot be visited, is bound to loom large in the further growth of the osteopathic movement in New York City. In turn, osteopathy there seems destined to contribute much to the movement nationally. The New York City group has already taught us the most difficult lesson—the worth of struggling *together!*

PHYSICAL MEDICINE AND REHABILITATION

A group of significant papers presented in this issue of THE JOURNAL was made available by the American Osteopathic College of Physical Medicine and Rehabilitation, one of the more recently formed affiliate bodies of the American Osteopathic Association.

As yet, membership of the College is small and osteopathic physicians certified by the examining and certifying agency of the specialty, the American Osteopathic Board of Physical Medicine and Rehabilitation, are few. But, limited though this specialty is in its early period of development in the osteopathic profession by the small number of doctors qualified to speak for its purposes and lead others toward the achievement of its goals, it possesses a tremendous potential for revitalizing the osteopathic movement and reorienting other sectors, especially that which relates to manipulative care.

Certain of the leaders of the College of Physical Medicine and Rehabilitation are also responsible for the specialty training program in the field—one almost unknown in any detail among members of our profession. The attention of our readers, especially our interns and college students, is called to two of the papers referred to above, one, "The Role of the Specialist in Physical Medicine and Rehabilitation in the Practice of Osteopathic Medicine Today," by Dr. William W. W. Pritchard, chairman of the specialty board, and the other, "Physical Medicine and Rehabilitation As a Specialty," by Dr. J. M. Andrews, professor and executive, Department of Physical Medicine, College of Osteopathic Physicians and Surgeons. These papers set forth the place of physical medicine and rehabilitation in the osteopathic movement today—not in some fancied golden age of an osteopathic past or in a medical or osteopathic Utopia of tomorrow.

The other papers in this group, those of C. R. Starks, D.O., Laurence E. Morehouse, Ph.D., and Philip J. Rasch, M.Ed., present other pertinent aspects of physical medicine and rehabilitation. This whole question is a timely one and directly related to many of the problems of present-day osteopathic medicine as they arise within the total structure of medicine.

There are several very practical and definite trends that can be discerned in physical medicine, relating not to its nature but to its further implementation, only getting under way in the profession of medicine, and scarcely introduced in the osteopathic profession. One relates to the possibility that the state bodies charged with licensing hospitals may, in the not too distant future, make it mandatory that larger institutions be built with space for a department or service of physical medicine and rehabilitation. The other trend is the manifest activity of the Federal Government in forwarding the development of this field of medicine, especially as a responsibility of the Office of Vocational Rehabilitation. Doubtless grants would be available to osteopathic colleges and to osteopathic hospitals that are prepared to meet the proper standards. This is a matter for the future, but it is not one moment too soon for the osteopathic profession to make available, much more widely, facilities for training its physicians in physical medicine and rehabilitation. The need and the demand for properly qualified men seem destined to come upon us within the next 5 years—let us say—as a flood! Only by planning and foresight will we be prepared to meet it.

Just now the osteopathic profession offers training in this field in but two places: 1. The Rehabilitation Center at the College of Osteopathic Physicians and Surgeons offers a 3-year fellowship in physical medicine and rehabilitation meeting the requirements to take the examination for certification. It also offers fellow-

ships for those who have practice or experience credit of 1 to 2 years. 2. The Los Angeles County Osteopathic Hospital offers a 3-year residency meeting the requirements to take the examination for certification.

The entire question of the relationship of physical medicine and rehabilitation was explored editorially in considerable detail by THE JOURNAL in the June, 1955, issue. The matter was discussed from the standpoint of its proponents and opponents within the profession; in the light of the questions that are being asked or implied by doctors of osteopathy about the relationship of the field to osteopathy; and, finally, in connection with the fresh insights and new goals that physical medicine and rehabilitation can supply to the osteopathic movement. THE JOURNAL emphasized then that:

> The time has come for the proponents of physical medicine and rehabilitation within osteopathy to explore all the methods of communication by which they can inform and educate osteopathic physicians concerning the startling relevancy of their program to this profession. The program has already demonstrated its worth in widening the appreciation of many osteopathic students to a structural approach to health problems as well as to the effectiveness of osteopathic manipulative therapy.

The osteopathic movement in many of its sectors has begun to be restated and reidentified for itself and for other groups within the meaning and language of the midcentury as a movement within the totality of medicine. Physical medicine and rehabilitation—as it is organized both within the osteopathc profession and as it is much less broadly conceived within the medical profession—represent one phase of the movement's continuing challenge to fulfill its destined purpose.

THE HOSPITAL SUPPLEMENT

Readers of THE JOURNAL will welcome the addition of the Hospital Supplement to its series of supplements, which actually are annual sections set apart for publication of papers from various osteopathic specialty groups. Supplements, for the most part, are made up of papers presented at the annual conventions of particular groups, and this is true of this first American Osteopathic Hospital Association Supplement—with but one exception the papers included were presented at the meeting held in Washington, D.C., October 31 to November 2, 1955.

THE JOURNAL is proud to present this Supplement for the information and benefit of the members of the American Osteopathic Association—as well as to give the articles wide circulation which this periodical affords, going as it does to many persons and places totally outside osteopathic boundaries. It should be but the first of a series of hospital supplements, growing larger from year to year and richer in content.

A strong national service organization for osteopathic hospitals is a natural and logical development in a profession in which institutional osteopathy not only plays an important part today, but in which hospital facilities were made available to the profession almost from its beginning. The fact is too little known that the first osteopathic hospital was established in Kirksville, Missouri, in 1895. An initial group of persons trained as doctors of osteopathy under a preceptorship by Dr. Still were named as such in 1892 and the first school of osteopathy was founded in that same year. The first college hospital was opened in 1905, actually as a direct continuation of the 1895 institution. Significantly the hospital's training school for nurses was recognized by the Missouri State Nursing Board in 1906.

Four hundred osteopathic hospitals is no sporadic happening; a banding together of more than half of the osteopathic institutions—it would be so much to their interest and to the profession's welfare if all were members—is not a happenstance! There is no other way in which osteopathic hospitals can get so much help with their everyday problems, nor inspiration toward a larger service, than through active participation in the program of the American Osteopathic Hospital Association.

There is one point about which there remains some misunderstanding: that is the relationship of the Hospital Association and the Bureau of Hospitals of the American Osteopathic Association. It is quite important that their purposes should be clearly understood as completely different and their functions entirely separate, the one body in no sense covering the work of the other.

Without the A.O.A. Bureau of Hospitals there could be no osteopathic hospitals recognized and approved as official institutions of the profession. Nor would the profession have intern and resident training programs as integral parts of osteopathic education—actually, the profession's training program grows out of the primary duty of the Bureau, which is the inspection and evaluation of osteopathic hospitals as teaching institutions. As organized osteopathy is now constituted, it would be impossible for the Hospital Association to assume this responsibility. As a matter of fact, programs of the two bodies are at two opposite poles, and yet the best interests of hospitals demand that the Bureau and the Hospital Association go along closely together. And that they do, in complete understanding and accord. But neither can render its distinctive services to the fullest if there is lack of understanding of the absolute necessity of the one and the tremendous helpfulness of the other in promoting the best possible medical, surgical, and hospital service that can be obtained in any given community.

Confusion has arisen in relation to the Registry of Hospitals published by the American Osteopathic Association and the Directory of the American Osteopathic Hospital Association. The Registry is revised each July to include only those hospitals certified by the A.O.A. for the given year. It is the official source of: (1) Hospitals Approved for the Training of Interns, (2) Hospitals Approved for the Training of Residents, and (3) hospitals meeting such A.O.A. Bureau standards as entitle them to be listed as Registered Osteopathic Hospitals. The A.O.H.A. Directory contains the authentic list of its member hospitals plus other pertinent and valuable information. Its usefulness is increased by reprinting from the A.O.A. Registry the official listings referred to above.

The limitations of editorial space forbid a resume here of what it means to belong to the American Osteopathic Hospital Association. The organization's 1956

Directory itemized its tangible membership worth with becoming modesty in two and one-half pages but with confident pride. It should be read by all who are in administrative positions in osteopathic hospitals. The final word of the statement epitomizes so accurately what it means to belong to the Association that it is repeated here: AOHA membership doesn't cost—it PAYS."

The Editors of THE JOURNAL hope that many of its readers join them in congratulating the Hospital Association and its officers on this first issue. The president is Mrs. Alixe P. Nuzum of Des Moines General Hospital; the executive secretary is Mr. Robert P. Chapman, 604 Kahl Building, 326 East Third Street, Davenport, Iowa. Mr. Chapman is also the editor of the current supplement.

Notes and Comments

Surgeon General.—

Dr. Leonard A. Scheele began his third term as Surgeon General of the United States Public Health Service on April 16. Surgeon General since 1948, he has spent his entire professional career in the Public Health Service, which he entered in 1934. After 2 years in the quarantine service, he was assigned to the National Cancer Institute and became a member of its staff in 1939. His cancer control activities were interrupted during World War II when he was assigned on detail to other government agencies. When he returned to Public Health Service duties in 1945, he was named Assistant Director of the National Cancer Institute. In 1947 he became Director of the Institute and served in that capacity until he became Surgeon General. He is the seventh person to hold his office since it was created in 1870.

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Inflammation and Invasiveness.—

The invasiveness of a micro-organism is largely related inversely to the extent of local injury and reaction it causes, according to Valy Menkin, writing in *Science* for March 30, 1956. Thus, according to Dr. Menkin, who is head of the Agnes Barr Chase Foundation Research at the Temple University School of Medicine, staphylococcic infections are more often localized and held in check precisely because they cause severe local injury when they enter the body through a wound or other portal, with the result that the body reacts more vigorously to them. This reaction, which takes the form of inflammation, occludes the lymphatic vessels and incites an immediate leukocytic response, effectively walling off and isolating the infection so that the body can deal with it before it becomes widespread. Streptococci, on the other hand, are more dangerous to the body as a whole simply because it does not react so vigorously to their early invasion, allowing them to spread unhindered.

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Fluoridation.—

Fluoride metabolism and its significance in relation to water fluoridation are discussed in a paper which was presented at the New York Institute of Clinical Oral Pathology and published in the *Journal of the American Dental Association* for March, 1956. The author, Harold C. Hodge, Ph.D., of the University of Rochester School of Medicine and Dentistry, notes that fluoride is rapidly excreted from the body by the kidneys or, to some extent, stored by the bones and teeth, and is not cumulative in the blood or soft tissues. In the bones, the fluoride ion is normally found to some extent in any case, and there is no evidence that the small increase found when people drink fluoridated water is harmful in any way. Dr. Hodge also emphasizes that concentrations used in standard fluoridation of water supplies cannot produce acute fluoride poisoning, crippling fluorosis, or osteosclerosis, and is even very unlikely to produce mottled enamel in the teeth, the most common problem seen with excessive intake of fluoride. While it is often charged by opponents of fluoridation that its use in drinking water increases the incidence of cancer or diseases of the heart, thyroid, or kidney, all available evidence indicates that there is absolutely no basis for this contention. During the July, 1955, meeting of the A.O.A. House of Delegates it moved the adoption of a recommendation of the Board of Trustees that the American Osteopathic Association go on record as favoring the fluoridation of fluoride-deficient public water supplies where the program is scientifically controlled by competent health authorities.

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In Briefer Form.—

Recent research at the University of California's College of Dentistry at San Francisco indicates that deficiencies of pantothenic acid and nicotinamide may play a role in the development of pyorrhea, now ascribed primarily or solely to local irritants, such as tartar on the teeth. . . . Eleven grants were made recently by the U. S. Public Health Service to enable hospitals, health agencies, and community groups to conduct research into ways of improving hospital services, according to a recent announcement by Surgeon General Leonard A. Scheele. . . . Soviet surgeons are reported to have developed quick, effective, sutureless anastamosis for blood vessels. Dr. Morton I. Berson, a surgeon who has just returned from a world lecture tour sponsored by the World Medical Association, described the procedure as ". . . one of the most fantastic things I've ever seen . . ." and said he was greatly impressed by its effectiveness and simplicity. . . . The *Deutsche medizinische Wochenschrift*, a leading German medical journal, is now available in a monthly English language edition under the title *German Medical Monthly*. The English edition will carry the most important articles from *Deutsche medizinische Wochenschrift* as well as other features from German medical clinics and research institutes.

PATHOLOGIC MANIFESTATIONS OF THE ARTERIOSCLEROTIC STATE—ARENDS

(Continued from page 636)

Microscopically, interstitial fibrosis with round cell infiltration is present. Many fibrotic and atrophic glomeruli are contained in these scars as well as scattered about. The major branches and arcuate arteries show sclerosis.[14]

Benign nephrosclerosis is the arteriolosclerotic state of the kidney seen in hypertension. The kidney varies in size, depending on the severity and duration of the disease. Fairly early in the disease, the kidneys show a fine granularity and usually have a blue-red hue. The size of the kidney is normal and the capsule strips fairly readily. Microscopically the arcuate, subarcuate, and interlobular arteries show elastic hyperplasia. The afferent arterioles show hyaline thickening, and the glomeruli show collagenous thickening of the basement membrane of the glomerular capillaries. Progression of these changes results in a small contracted kidney moderately pitted and scarred in some instances.

CAUSES OF DEATH

Clinically, then, hypertension and arteriosclerosis in combination show several pathologic types.[15] One is the myocardial type characterized by left ventricular hypertrophy. These patients usually die in a state of congestive heart failure when cardiac reserve is exhausted. The second type is the cerebral type in which spasm of cerebral vessels is the most prominent feature. Individuals with this type usually die of hemorrhage and infarction. The third type, or coronary type, is one in which there is much overlapping of atherosclerosis and arteriosclerosis. Death occurs on the basis of occlusion or thrombosis. A renal insufficiency type is that group in which sufficient numbers of glomeruli and tubules have been destroyed so that retention of catabolites results in chronic uremia with ultimate death.

Necrotizing arteriolitis, as seen in malignant hypertension, is believed by some to be a separate type of disease.[15] Others feel it is an accelerated process occurring in individuals with benign hypertension.[5] The kidney is the unshrunken type of benign nephrosclerosis, but shows, in addition to the cortical granularity, punctate hemorrhages. Microscopically, fibrinoid necrosis is seen in the arteriolar walls accompanied by hemorrhage into the walls. Intimal fibrosis and thrombosis are seen. The fibrinoid necrosis in the afferent arterioles may extend to the glomerular capillaries. Other small vessels may be thrombosed. Glomerulitis with formation of epithelial crescents can be found. Afferent arteries may show intimal fibrosis in other areas. Hemorrhage into the stroma accounts for the gross change.

The retinal arteries and retina itself reflect somewhat the renal arteriolar changes. Diffuse and marked constriction occurs with swelling of the optic nerve head that resembles papilledema. Edema of the disk and retina are accompanied by numerous superficial hemorrhages and cotton-wool exudates scattered about the fundus and with a star-shaped figure in the macula. These changes may be superimposed upon those of benign hypertension.

Clinical manifestations fall into two groups. The first group is characteristically one in which fulminant renal failure occurs. Acute uremia, therefore, occurs with typical symptoms. The second group is one in which cardiac reserve is rapidly exhausted. Congestive heart failure is, thus, again seen as a terminal manifestation of arteriolar sclerosis.

SUMMARY

Arteriosclerosis has been briefly classified and defined as to types. The major pathologic changes, both of a microscopic and gross nature, have been briefly described. Complications of arteriosclerosis of a pathologic and anatomic nature have been mentioned. Findings resulting in or producing death have been summarily reviewed.

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Proposed Amendment to the Bylaws of the American Osteopathic Association

R. C. McCAUGHAN D.O.
Executive Secretary

Article II—Membership

(The following proposed amendment is published at the request of the Chairman of the Bureau of Professional Development and would provide for junior membership in the Association.)

Amend Article II by adding a new Section 6 to read as follows:

Junior membership status may be granted to any undergraduate student in an approved college of osteopathy, upon endorsement of his application by the president of the college, or to any graduate of an approved college of osteopathy who must show evidence of an approved internship before receiving his diploma. The application of such graduate shall be endorsed by the governing body of the hospital in which he is pursuing his internship.

Junior members shall pay annual dues in an amount to be set by the Board of Trustees, but such dues shall not be more than five dollars ($5.00), payable in advance to the Treasurer on or before June 1, the beginning of the fiscal year.

Each Junior member shall receive such publications and other literature as may be directed by the Board of Trustees or the House of Delegates.

Junior members shall not be eligible to hold office or to vote in the affairs of the American Osteopathic Association.

Department of Public Affairs

DONALD M. DONISTHORPE, D.O.
Chairman
Los Angeles

BUREAU OF PUBLIC EDUCATION ON HEALTH

CARL E. MORRISON, D.O.
Chairman
St. Cloud, Minn.

THE LIABILITY OF A HOSPITAL FOR ACTS OF ITS STAFF

It is frequently stated to be the law that a hospital has a legal and moral obligation toward its patients requiring the hospital to insure that the members of its professional staff are competent and ethically sound and that the staff must provide care in accordance with accepted and established practice. A hospital because it cannot legally engage in the practice of medicine is not generally liable for the negligence of physicians on its staff unless such physicians are employed by the hospital or are acting as its agents. It is presumed that a hospital will exercise due or reasonable care in appointing physicians to the staff, and the exercise of such care is ordinarily sufficient to prevent any liability attaching to the hospital because of the physician's medical acts.

The legal text, *Law of Hospital, Physician and Patient,* states the rule to be, at p. 89:

> The hospital impliedly represents to its patients that its physicians, nurses and attendants possess the requisite degree of learning, skill and ability for the practice of their profession. No liability ordinarily will attach to the hospital for negligent treatment by a physician which results in injury to the patient, unless it can be established that the authorities knew or ought to have known of his incompetence or had failed to use "due care in selection."

Appellate decisions in two cases support these legal principles. In *Byrd v. Marion General Hospital,* 162 S.E. 738 (1932), a North Carolina case widely cited, the court ruled that the principles affecting the legal liability of a hospital are:

> Ordinarily, when a hospital like the present one undertakes to treat a patient without a special arrangement or agreement, its engagement implies three things: (1) that its physicians, nurses, and attendants possess the requisite degree of learning, skill, and ability necessary to the practice of their profession, and which others similarly situated ordinarily possess; (2) that its physicians, nurses, and attendants will exercise reasonable and ordinary care and diligence in the use of their skill and in the application of their knowledge to the patient's case; and (3) that its physicians, nurses, and attendants will exert their best judgment in the treatment and care of the case.

These three principles are ones which have received general acceptance by courts. They may be said to constitute the common law applicable to hospitals and you will note are not dissimilar to those principles applicable to physicians in their own practices. In *Roewekamp v. New York Post-Graduate Medical School,* 27 N.E. 2d 442 (1940), a verdict for a plaintiff against a charitable hospital because of the negligent care provided by a staff physician was set aside because the "plaintiff failed to establish that at the time defendant assigned the doctor to perform the operation it knew or ought to have known he was incompetent." If the patient had proven that the hospital knew or ought to have known that the staff physician was incompetent the hospital would have been liable for that physician's negligence.

In *41 C.J.S. Hospitals,* Section 8(2), the law is stated to be that:

> In some jurisdictions it is held that a private hospital owes to a patient the duty of exercising reasonable care in the selection of its professional staff, and, if it exercises such care, it is not liable for the professional acts of its staff under the doctrine of respondent superior. In other jurisdictions, a hospital may be liable for the negligent acts of its professional staff even while they are acting in their professional capacity.

Another statement frequently made is that a hospital is liable for "hospital" care, but not "professional" care. Apparently, even in those jurisdictions which restrict the liability of a hospital to acts pertaining to "hospital care" the exercise of due care in the selection of the physicians on the staff is classified as a duty of the hospital and a responsibility which it alone can exercise.

In many states it is the law or has been the law that a charitable hospital is not liable for the negligence of its employees. Courts are continually chipping away at this principle of immunity from liability of charitable hospitals. Some courts have been influenced in restricting this principle of liability by such facts as whether the patient-plaintiff was paying for the hospital services or whether the hospital was insured. A considerable number of courts have held the principle to be obsolete under modern conditions and have held the rule no longer applicable to charitable hospitals in their states. An excellent review of the issues and authorities pertaining to this rule of law may be found in *Pierce v. Yakima Valley Memorial Hospital Association,* 43 Wash. 2d 162, 260 P. 2d 765 (1953) wherein the Supreme Court of Washington imposed liability on a charitable hospital despite the fact that in similar cases in 1913, 1918, 1939, 1940 and 1943 such liability on the part of a charitable hospital had been denied. In no state can it be said, therefore, that the mere presence of current opinions upholding the rule can give assurance that the courts will follow the rule in the future when other cases of the same type come before them.

Department of Public Relations

CHESTER D. SWOPE, D.O.
Chairman
Washington

"DISABILITY FREEZE"

The osteopathic physician may sometimes be asked by his patients to complete a medical report in connection with the "disability freeze." Some knowledge of what the "freeze" is and the information he can furnish about the disability of his patient should prove helpful.

Briefly, the "disability freeze" is a provision of the Social Security Act enacted in 1954 to permit the accumulated Social Security credits of a disabled individual to be preserved intact throughout the period of his disability. The provision was designed for individuals who were severely disabled by reason of a physical or mental impairment which rendered them unable to engage in substantial gainful employment. It was further restricted, from the point of view of severity, to those whose impairment would be permanent or prolonged, where the possibility of recovery or significant lessening of the disabling effects could not be foreseen. For this group whose previously acquired Social Security protection would be adversely affected without a "freeze" of their present credits, this new provision of law has much significance.

Of equal significance is the provision that all disabled individuals who inquire about or apply for this "freeze" protection will be informed about the rehabilitation services available through the state rehabilitation agency and will be referred to these agencies. The state rehabilitation agency will, in most cases, be responsible for developing necessary medical evidence and for determining the applicant's disability, under an agreement with the Federal Government. They will, at the same time, be able to give consideration to his possible rehabilitation. For many disabled individuals, whose work capacity can be partially or fully restored by such rehabilitation services, this feature of the "freeze" program will be of great importance.

The applicant for this "freeze" action bears the main responsibility for securing the medical evidence needed to establish whether his disability meets the requirements of the law. The applicant will, in most instances, request this information from practicing physicians who are treating him or have treated him in the past.

Shown below is a facsimile of the Medical Report which is furnished to the applicant for a "freeze." It was designed primarily as a guide to the physician to show the nature and extent of clinical detail that should be reported so that a medi-

cally sound determination of disability can be made.

In Items 2 and 5 the physician should furnish information about the onset of the impairment, the time when it became so disabling as to prevent work, and a history of the medical treatment received by the applicant.

Items 3 and 4 ask for the diagnosis of the impairment and for the related objective clinical findings and subjective symptoms which the physician has determined by actual examination. Without a knowledge of the clinical findings which lead to the diagnosis, a sound decision as to the severity of the condition cannot be reached. For example, where a physician gives a diagnosis of hypertensive heart disease, but does not provide the clinical findings in such a case, those who are responsible for making the determination would be unable to assess the degree of impairment. A considerable range of more or less disabling effects will always accompany this condition, and it is these factors which will determine the extent of impairment. The degree of dyspnea, the extent of renal involvement, et cetera, are all vital considerations in this decision. As a further example, a diagnosis of rheumatoid arthritis presents the same problem; without a good picture of the extent of impairment, based on a thorough clinical description, a decision as to the severity of the patient's impairment cannot be made. Every effort should be made, therefore, to furnish a complete clinical description in these items.

Item 6 requests the physician to supply information relating to the expectation for recovery, improvement, or deterioration in the disabling effects of the patient's impairment. The physician's medical judgment as to the permanence of the disability and his advice to the patient about whether or not to work are sought. Although the physician is not asked to decide whether the applicant is or is not totally disabled, his own estimate of the future course of the disabling condition can be valuable in the reviewing physician's medical assessment.

In Item 7 the physician can add specific findings to the evidence provided in Items 3 and 4 in four categories of impairments which constitute about 68 per cent of all impairments alleged by applicants for the "freeze." Full answers to Items

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Social Security Administration
Bureau of Old-Age and Survivors Insurance

Form approved.
Budget Bureau No. 72-R510.1.

MEDICAL REPORT

NOTICE TO PHYSICIAN: The applicant is responsible for securing the information requested without expense to the Government. You may use this form or your own letterhead, if you prefer. Please make your report complete enough to enable a reviewing physician to determine the nature and severity of impairment.

(Name) (Date of birth) (Social Security Number)

1. PHYSICAL MEASUREMENTS
Give applicant's height and weight at last visit . . inches lbs.

2. HISTORY
(a) When did present illness or injury occur? . .
(b) Date applicant became unable to work . . . .
(c) Is there a previous history of this illness? If "yes," describe . . . . . .

3. PRESENT CONDITION (ALL MAJOR IMPAIRMENTS)
(a) Subjective symptoms . . . . . .
(b) Objective findings . . . . . *Give report of X-rays, EKG's, laboratory or other diagnostic tests, with dates. Use separate sheet if necessary.*
(c) Is applicant . . . . . Ambulatory? ☐ Bed confined? ☐ House confined? ☐ Hospital confined? ☐

4. DIAGNOSIS (If TB, use National Tuberculosis Association Classification)

5. TREATMENT
(a) Therapy and response . . . . . .
(b) Date of first visit _____ Date of last visit _____ Frequency of visits _____
(c) When did you last examine the applicant? . .

6. PROGRESS
(a) Is condition static? . . . . . .
(b) If not, what optimum improvement can be expected, if any? . . . . . .
(c) When? . . . . . 6 Months ☐ 1 Year ☐ Indefinite ☐
(d) Have you advised applicant not to work? . . .

Form SSA-3855
(12-55)

(OVER)

7. Complete appropriate sections if impairment is CARDIAC, RESPIRATORY, ARTHRITIS or NEUROLOGICAL

CARDIAC
(a) Functional capacity (American Heart Assn.)
Class 1 (No limitation of physical activity) ☐
Class 2 (Slight limitation) ☐
Class 3 (Marked limitation) ☐
Class 4 (Complete limitation) ☐
(b) Blood pressure . . . . . .
(c) Edema . . . . . .
(d) Dyspnea . . . . . ☐ At rest ☐ On slight exertion ☐ On moderate exertion

RESPIRATORY
(a) Acute attacks . . . . . ☐ Yes ☐ No
Frequency, duration and severity . . . . . .
(b) Deformity of chest wall . . . . . .
(c) Emphysema . . . . . .
(d) Vital capacity (Degree) . . . . . .
(e) Dyspnea . . . . . ☐ At rest ☐ On slight exertion ☐ On moderate exertion

ARTHRITIS
(a) X-ray report . . . . . .
(b) Physical Findings.—Give specific joints involved; describe deformities, tissue and bone destruction; limitation of motion . . . . . .

NEUROLOGICAL
Describe any of the following conditions that are present, indicating degree, distribution, and residual function in affected parts . . . . . .
Atrophy — Tremors
Paralysis — Gait
Hemiplegia — Reflexes
Lab. findings: Cerebrospinal fluid (Wassermann, protein, cell count, etc.), X-ray findings, EEG's, other . . . . . .

8. Remarks

PLEASE PRINT OR TYPE NAME OF PHYSICIAN OR ORGANIZATION | SIGNATURE AND TITLE

ADDRESS | CITY | STATE | DATE

U. S. GOVERNMENT PRINTING OFFICE: 1955—O-355616

3, 4, and 7 will give a detailed clinical picture of the type of impairment and its present severity.

Item 8 requests the physician to add to his report any amplifying information which may help to complete the clinical picture he has furnished in the report itself.

The physician should return the report directly to the Social Security office where the applicant filed in order to avoid disclosure of this medical information to the applicant. The applicant's entire file will then be transmitted for a determination as to his disability. In most cases, the state rehabilitation agency will be making this determination under an agreement with the Federal Goverment, and the reviewing team in that agency will consist of at least one physician and one lay member.

The applicant's physician, in submitting medical evidence on the report form or in any other manner, should give enough clinical detail so that the physician on the state agency reviewing team can assess the nature, the present extent, the onset history, and the probable future course of the impairment described. Although the final determination must include an evaluation of nonmedical factors such as age, education, and vocational history, the medical information submitted is the primary evidence for or against a finding of disability. Thus, the role of the physician in the "freeze" program is a vital one and the careful completion of the Medical Report, or the submittal of this information in another form, is his most significant contribution to sound determinations for those of his patients who have applied for this protection.

RENEW FEDERAL NARCOTIC AND MARIHUANA PERMITS

Osteopathic physicians and osteopathic colleges or research laboratories must renew their Federal narcotic permits every year before July 1. Failure to do so entails severe penalties.

On or before July 1 each osteopathic physician who wishes to dispense, prescribe, or administer marihuana in his practice must, under the provisions of the Federal Marihuana Tax Act, pay a $1.00 annual tax and register or reregister with the Director of Internal Revenue for each of the districts in which he practices.